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# Mason Creek Water Quality Characterization Report

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Presented to:

City of Norfolk

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Prepared by:



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## 1. Introduction

The purpose of this report is to document a campaign of regular monitoring of water quality indicators within Mason Creek. Electronic measurements and bottle samples were collected within the creek, and the bottle samples were analyzed by EnviroCompliance Laboratories (ECL), on various dates between October 10, 2012 and September 19, 2013. This report presents the methods and results of the sampling along with an interpretation of the results regarding the present state of the water quality regime within Mason Creek.

Figure 1 displays a map of the six sampling locations. Locations #1 through #5 were chosen to represent the spatial variability of water quality indicators within Mason Creek. At the outset, it was expected that values measured near the culvert to Willoughby Bay (represented by #2) would differ from values measured in the upstream reaches of the creek at #1 and #5. Location #6, in Willoughby Bay, was added in August and September 2013, to provide boundary conditions for the water quality model of Mason Creek that Moffatt & Nichol is conducting as part of a separate scope of work.

Mason Creek is a micro-tidal brackish water body that is connected to tidal Willoughby Bay via a box culvert of dimensions of 20 ft wide by 11 ft high by 1,800 ft long. The watershed draining to Mason Creek consists mainly of a Navy airfield, low- to medium-density residential neighborhoods, parks, a cemetery, and two interstate interchanges with water crossings. Non-tidal flow to the creek consists primarily of rainfall-runoff generated locally, with little to no upstream inflow from outside of the immediate vicinity. Tidal flows into the creek are limited by a tide gate structure on the culvert where it enters Mason Creek. The gate is designed to be closed when water levels in Willoughby Bay are forecast to be high, to prevent surge-driven flooding within Mason Creek. Baffles in the gate are designed to allow Mason Creek to drain toward the Bay, even when the gate is closed. Still, the culvert and gate limit the water exchange between Willoughby Bay and Mason Creek; for example, significant differences in salinity between sampling location #2 and locations #1, #3, and #4 indicate the low rate of exchange between Willoughby Bay and Mason Creek.

A second culvert exists within Mason Creek, at the Granby Street crossing, dividing the creek into western and eastern basins. The eastern basin is the smaller of the two, and during the course of this study it exhibited noticeable differences from the western basin in key water quality indicators.

The first objective of this study is to determine if a measurable water quality problem in the form of excess eutrophication exists in Mason Creek. Odor from the creek that has sparked citizen complaints may stem from natural processes that occur in wetting and drying of mud flats in a tidal marsh, which can result in the release of hydrogen sulfide and potentially methane gas, which can result in unpleasant odors. It is also possible that increased nutrient loads and the restricted outlet may be acting in concert to cause excessive eutrophication in the creek, and foul odors may be the result of algal bloom conditions in the open waters of the system.

The second objective of the proposed water quality characterization is to determine if tangible water quality benefits may be realized through the dredging of Mason Creek. The water quality sampling will also provide information necessary to support the permitting process for dredging in Mason

Creek, if it is determined that such action would provide a real benefit to water quality and/or flood mitigation efforts in Mason Creek.



Figure 1: Mason Creek water quality sampling locations

## 2. Monitoring Approach and Sampling Dates

The study includes the measurement of temperature, salinity, conductivity, dissolved oxygen, and pH via portable YSI 556 multi-parameter meter, in conjunction with laboratory tests of nutrient series (N, P), chlorophyll *a*, organic carbon, suspended sediments, and bacterial pathogen indicators. Field measurements and/or bottle samples have been collected on 14 dates, including four wet-weather dates, at five locations within Mason Creek (shown on Figure 1); samples were also collected near the culvert's exit into Willoughby Bay on the last two dates. Table 1 contains a list of the field work dates with types of measurements and sampling conducted.

*Table 1: Summary of sampling dates*

Date	Comment	Wet-Weather?	YSI 556 Instrument: pH, DO, T, S	Bottle Samples with ECL Lab Tests: N, P, chlorophyll-a, organic carbon, suspended sediments, pathogens
10/10/2012	possibly brown algae visible	yes	yes	yes
10/31/2012	two days post-Hurricane Sandy	yes	yes	yes
11/26/2012			yes	yes
01/07/2013			yes	yes
03/01/2013			yes	yes
03/28/2013	visible algae bloom starting		yes	yes
04/18/2013	green algae mats widespread		yes	no
05/13/2013	visible algae mats depleted		yes	yes
06/06/2013			yes	no
06/11/2013		yes	yes	yes
07/03/2013	possibly brown algae visible	yes	yes	yes
07/31/2013			yes	no
08/27/2013			yes	yes
09/19/2013			yes	yes



### 3. Sampling Results

The instrument and laboratory results have been tabulated for all of the sampling events at the five locations within Mason Creek, and summary tables are provided in Appendix A to this report. Each table in Appendix A represents a single sampling location's data. The tables also include information on the time that each sample was collected, the qualitative tide position at Sewells Point and within Mason Creek, approximate wind conditions, and cumulative rainfall for the prior 24, 48, and 72 hours. Wind and rainfall data are based on measurements recorded at Norfolk International Airport.

For an alternative view of the data, Figure 4 through Figure 15 display results for each field sampling event at all of the sampling locations, with each figure representing a single water quality parameter. Each vertical shaded bar in the figures indicates the value of the parameter at a different sampling location, identified in the figure legend. The y-axis indicates the parameter value, and the x-axis indicates the sampling date for each group of bars.

The paragraphs below discuss the charted results, making reference where applicable to water quality standards referenced from the Virginia Department of Environmental Quality (VDEQ) website. The standards are defined in the Virginia Administrative Code (VAC) under Title 9 Environment, of the State Water Control Board (Agency 25), Chapter 260 Water Quality Standards.

#### Physical Parameters: Salinity, Temperature, Dissolved Oxygen, and pH

Figure 4 shows the variation in salinity within the creek. In general, higher salinities were recorded at location #2 (nearest the culvert to Willoughby Bay), while location #5 in the eastern basin (east of Granby Street) often had significantly lower salinity than the western basin. This result probably indicates a low degree of water exchange between the western basin and eastern basin.

The October 31, 2012 sampling event occurred two days after Hurricane Sandy passed through Hampton Roads. The very low salinities recorded at locations #1, #3, #4, and #5 reflect the significant volume of freshwater runoff that entered Mason Creek due to the hurricane.

Water temperature (Figure 5) did not vary significantly within the creek on a given sampling day. The downward trend in water temperature from October through March is reasonable and as expected, as is the warming trend from April through July. In August and September, water temperatures were slightly lower than the summer peak temperatures.

The sharp increase in water temperature between March 28 and April 18 coincided with an algae bloom that was beginning to be evident on March 28 and resulted in widespread algae visible on the surface by April 18. As water temperature rises and solar irradiance increases in spring and summer, algal production increases. Higher water temperatures also cause the DO saturation concentration to decrease. Thus, as the data show, the DO values in spring and summer are lower even though at times the DO concentration is at or above saturation (Figure 6 and Figure 7). The DO saturation concentration has decreased due to the warmer water.

Algae produce oxygen during the day due to photosynthesis, and they consume oxygen at night due to respiration. The spring and summer conditions result in dramatic increases in algal production.

There are times that DO is well above saturation during these warm months due to high net algal production. In general, algal blooms do not cause a DO problem until the bloom begins to die, thus rapidly consuming more oxygen than is being produced. Algal mortality can be rapid during the onset and persistence of either cool weather or cloudy sky conditions. Additionally, once algae die and settle to the bottom, the deposited detritus can exert a sediment oxygen demand that consumes DO in the water column for prolonged periods. The reducing conditions in the sediments can also reduce sulfates in sediments yielding dissolved sulfides that can cause additional DO demand as well as odor problems. Under more strongly reducing conditions, methanogenesis can occur in the sediments.

Algal photosynthesis utilizes (removes) dissolved carbon dioxide (CO<sub>2</sub>) while generating DO. The loss of CO<sub>2</sub> causes the pH to increase. Thus, during daylight hours, the pH in the photic zone where algae are producing is usually higher than at night. During respiration, CO<sub>2</sub> is given off by algae while oxygen is consumed, thus pH decreases. In general, super-saturation of DO should coincide with elevated pH due to algal production. This behavior is evident for several stations during the summer when DO saturation is above 100 % while pH is greater than 8 (Figure 8; see for example location # 5 on July 3). Location # 4 on July 31 exhibits an example of lower pH, possibly caused by algal respiration exceeding algal growth, accompanied by low DO. It is noted that saline waters are generally more buffered than fresh waters and do not exhibit as much pH fluctuation, and pH is not as strong an indicator in brackish waters as it is in freshwater systems.

While only one growing season has been captured in the data, some conclusions can be drawn regarding eutrophication dynamics in Mason Creek based on the fluctuations exhibited in the data and the visual observation of conditions in the basin. Visual observations associated with the water quality sampling in March and April clearly indicated the progression of a nuisance algal bloom, with clearly visible floating mats (Figure 2). The mats appeared to be comprised of some green algae species, though blooms can sometimes be comprised of numerous types of algae. Without a full algal bio-assay, it is difficult to determine the type(s) present. The March water quality data, collected as the bloom was ramping up, exhibited the expected increase in DO levels driven by algal photosynthesis, with DO saturation levels in excess of 100% at all five stations. The March data also exhibited elevated pH levels, which can also be associated with bloom conditions. The decline in DO levels through April and May is partly attributed to an increase in water temperatures (shown clearly in the April 18 data), but the coincident decline in DO saturations through April and May indicate that algal die off and decomposition were likely exerting impacts on water column DO.

The decomposition of algae from the March-April bloom released nitrogen back into the water column which likely provoked another bloom beginning in the headwater embayment east of Granby Street in June. By late July, with the aid of several substantial rain events delivering non-point source nutrient loads to the creek, this second bloom appears to have moved out into all remaining portions of the water body, and diurnal dissolved oxygen cycling and/or decay associated with the bloom resulted in the lowest DO readings in the study, with DO levels approaching 2.0 mg/l at location #4 west of Granby Street. Visual observations indicated the presence of different algae species suspended through the water column, including possibly brown or diatomaceous algae. Spikes in DO saturation recorded in late August indicate that the bloom might have been cycling back up again at that time, despite little or no rainfall throughout the month.



*Figure 2: Photos of algae mats in March / April 2013*



The Virginia Administrative Code 9VAC25-260-185 discusses DO standards in the Chesapeake Bay and its tidal tributaries<sup>1</sup>. The standard specifies the following for open waters, year round:

- 30 day mean  $\geq 5$  mg/l (tidal habitats with  $> 0.5$  ppt salinity)
- 7 day mean  $\geq 4$  mg/l
- instantaneous minimum  $\geq 3.2$  mg/l at temperatures  $< 29^{\circ}\text{C}$

The samples in Mason Creek best represent instantaneous values. A single sample indicated DO concentrations less than the instantaneous minimum criteria of 3.2 mg/L. This occurred on July 31, 2013 at location #5 east of Granby Street. On that date, the other sampling locations also indicated their lowest DO concentrations measured during this study. The July 31 sampling definitely indicates the system was stressed in terms of DO at that time.

#### Nutrients: Nitrogen and Phosphorus Forms

Nitrogen and phosphorus are the primary nutrients required for algal growth, and either can limit growth. Nitrogen is usually the limiting nutrient in saline systems, including Mason Creek. These two nutrients are generally not harmful alone; rather it is their stimulation of excessive algal production that causes problems (eutrophication). Each of these two nutrients can exist in inorganic and organic forms. From organic matter, such as algal detritus, organic N and P are transformed into inorganic forms (ammonium and phosphate). Subsequently, ammonium undergoes nitrification leading to formation of nitrate. Algae require these inorganic nutrients for growth, thus ammonium, nitrate, and phosphate are utilized within the algal biomass fulfilling the nutrient cycle (organic to inorganic and return to organic).

Kjeldahl nitrogen is a common N measurement and is the sum of organic nitrogen and ammonium. Total Kjeldahl nitrogen (TKN) consists of particulate and dissolved organic N plus ammonium ( $\text{NH}_4$ ). If ammonium concentrations are low, as is the case most of the time in Mason Creek, then TKN is mostly organic nitrogen. Ammonium was non-detectable on most dates, particularly during the warm months. The absence of ammonium is most likely due to rapid algal uptake following its formation from mineralization of organic N. Ammonium was measured during the winter when algae concentrations were low. Nitrification of ammonium requires oxygen; thus, ammonium can cause some DO loss in addition to serving as an algal nutrient. However, the low concentration of ammonium observed during the summer would have had minimal impact on DO.

It is noted that the total nitrogen (TN) and TKN are highest in May and June (Figure 9 and Figure 10). Also, it can be seen that the TKN is approximately equal to the TN most of the year. TN is a measure of all nitrogen forms, including TKN and nitrate. When nitrate concentrations are low, as is the case in Mason Creek, TN is mostly TKN. Also, the high TKN measurement with little ammonium present indicates that most of the N was in organic form, and it is most likely algae and/or algal detritus. The high organic N in May and June could be allochthonous (i.e., inflowing organic matter) rather than autochthonous (i.e., algae), but that is doubtful given the generally lower rainfall inflows during those months. More than likely, the high organic nitrogen in May and June is

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<sup>1</sup> <http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC25-260-185>

autochthonous stemming from living and/or dead algae. Detritus from the March – April bloom could have been a contributor to the high organic nitrogen observed in May and June.

Except for a single low value at location #1 on July 3, 2013, ammonium concentrations (Figure 11) were not detectable except during the cooler periods of the study, when water temperatures were below 55°F. The detectable values in winter and absence in warm months indicates a high preference for algal uptake of ammonium. The measured ammonium concentrations are relatively high for the January 7 sampling. There are two potential sources of these high concentrations: release from benthic sediments, and inflows or loadings to the creek from the watershed. The source is not known since inflows were not monitored nor were sediment fluxes measured. It is suspected that there may be a source of ammonium in the watershed that could be manifested during certain conditions, such as high runoff. There was a high rainfall event at the beginning of January that could have yielded a loading of ammonium from the watershed. It is likely that the high ammonium levels in the winter contributed to the development of the algal mats that occurred in early spring.

For the pH and temperature ranges measured between October 21, 2013 and March 28, 2013, 9VAC25-260-155 lists chronic ammonium saltwater criteria<sup>2</sup> between 1.68 mg/L to 16.54 mg/L. Only the January 7, 2013 sample at location #5 east of Granby Street approached the VAC chronic saltwater criteria.

Total phosphorus (TP) consists of total (particulate and dissolved) organic P and total inorganic P. Total inorganic P includes various particulate and dissolved forms including the dissolved orthophosphate ion ( $\text{PO}_4^{3-}$ ), referred to as simply phosphate. Phosphate is required by algae for growth, thus it is often a key indicator of potentially eutrophic conditions. However, excess phosphate in Mason Creek may not be as much of a problem as N since this system is most likely N limited. Similar to N, P passes through a cycle of transforming from organic detritus to phosphate and phosphate is utilized in algal biomass returning to organic form.

Phosphate and TP concentrations were highest in the summer (Figure 12 and Figure 13). The reason for this is not known without monitoring watershed loadings to the creek, but a possible reason is benthic sediment release. Phosphorus can be stored in benthic sediments as a result of algal detritus settling and later released from the sediments as phosphate. Sediment release of phosphate usually peaks during the summer when sediment reducing conditions are greatest and DO is lower at the sediment water interface.

Phosphorus and nitrogen concentrations are not the best indicators of trophic status in saline systems such as Mason Creek. Nitrogen is usually the limiting nutrient, and the N cycle has several sources and sinks that make N concentrations deceiving regarding trophic status. These sources and sinks can include sediment denitrification, as well as nitrate uptake by sediments, and nitrogen uptake from the atmosphere by nitrogen-fixing algae. These processes are in addition to other processes, such as nitrification and algal uptake and settling. As a result, actual algal concentrations are probably the best indicator of trophic status for this system.

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<sup>2</sup> Chronic criteria are established as the 30-day average concentration of total ammonia nitrogen (in mg N/L) in saltwater not to be exceeded more than once every three years on the average.  
<http://lis.virginia.gov/cgi-bin/legp604.exe?000+reg+9VAC25-260-155>

Measurement of chlorophyll *a* (Chl-*a*) is the most common and cost effective method of obtaining an estimate of algal concentrations. Unfortunately, the Chl-*a* measurements and/or lab results from this study were not reliable. It should be noted that the water quality samples were analyzed for chlorophyll *a*, but the reported levels were too low to be credible, and the results had to be considered unreliable. For example, based on Moffatt & Nichol staff experience, the bloom conditions observed in March-April should have resulted in Chl-*a* levels in the range of 50-100 µg/L or higher, whereas the laboratory reported Chl-*a* less than 0.5 µg/L for that event. Site-specific water quality criteria for manmade reservoirs within the Tidewater Region vary from 25-60 µg/L; we believe that such a criterion in that range applied to Mason Creek would be violated in the algal growing season.

As an alternative to measured Chl-*a*, the TKN measurements were used to estimate the likely Chl-*a* concentrations. Based upon the water quality modeling conducted for this site, the algal N to TKN ratio is about 0.07. Additionally, the algal carbon to Chl-*a* ratio of 50 was used for this model. Using these ratios and an observed TKN value of 9 mg/L during June, the Chl-*a* concentration was estimated to be 68 µg/L. This estimate assumed that all of the TKN concentration in June was due to living algae rather than detritus. This Chl-*a* concentration is quite high and indicates eutrophic conditions. Based upon the TKN data, it is suspected that an algal bloom occurred during June, and this bloom could have led to lower DO, such as the low DO values observed on July 31.

### Pathogen Indicators

Figure 14 and Figure 15 display concentrations of fecal coliform presence indicators *Enterococcus* and *E. coli*. The high concentrations of these bacteria indicate that there is a strong source or sources of bacteria in the watershed that responds especially to intense or prolonged rainfall runoff events.

Virginia Administrative Code 9VAC25-260-170 lists several state standards for *E. coli* and *Enterococcus* in primary contact recreational uses in surface waters<sup>3</sup> (i.e. swimming):

- If there are insufficient data to calculate monthly geometric means in transition and saltwater (as is the case in Mason Creek), no more than 10% of the total samples in the assessment period shall exceed enterococci 104 CFU/100 ml.
- For beach advisories or closures, a single sample maximum of 235 *E. coli* CFU/100 ml in freshwater and a single sample maximum of 104 enterococci CFU/100 ml in saltwater and transition zones shall apply.

The dashed black horizontal line in Figure 14 and Figure 15 indicates the single sample maximum values from 9VAC25-260-170. The charts show that the *E. coli* and *Enterococcus* levels in the creek exceeded the VAC single sample limits several times during the monitoring period. Most of these occurrences were following significant rainfall – particularly after Hurricane Sandy in October 2012 – though the limits were also exceeded on days when little or no rain was reported in the prior 72 hours.

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<sup>3</sup> <http://lis.virginia.gov/cgi-bin/legp604.exe?000+reg+9VAC25-260-170>

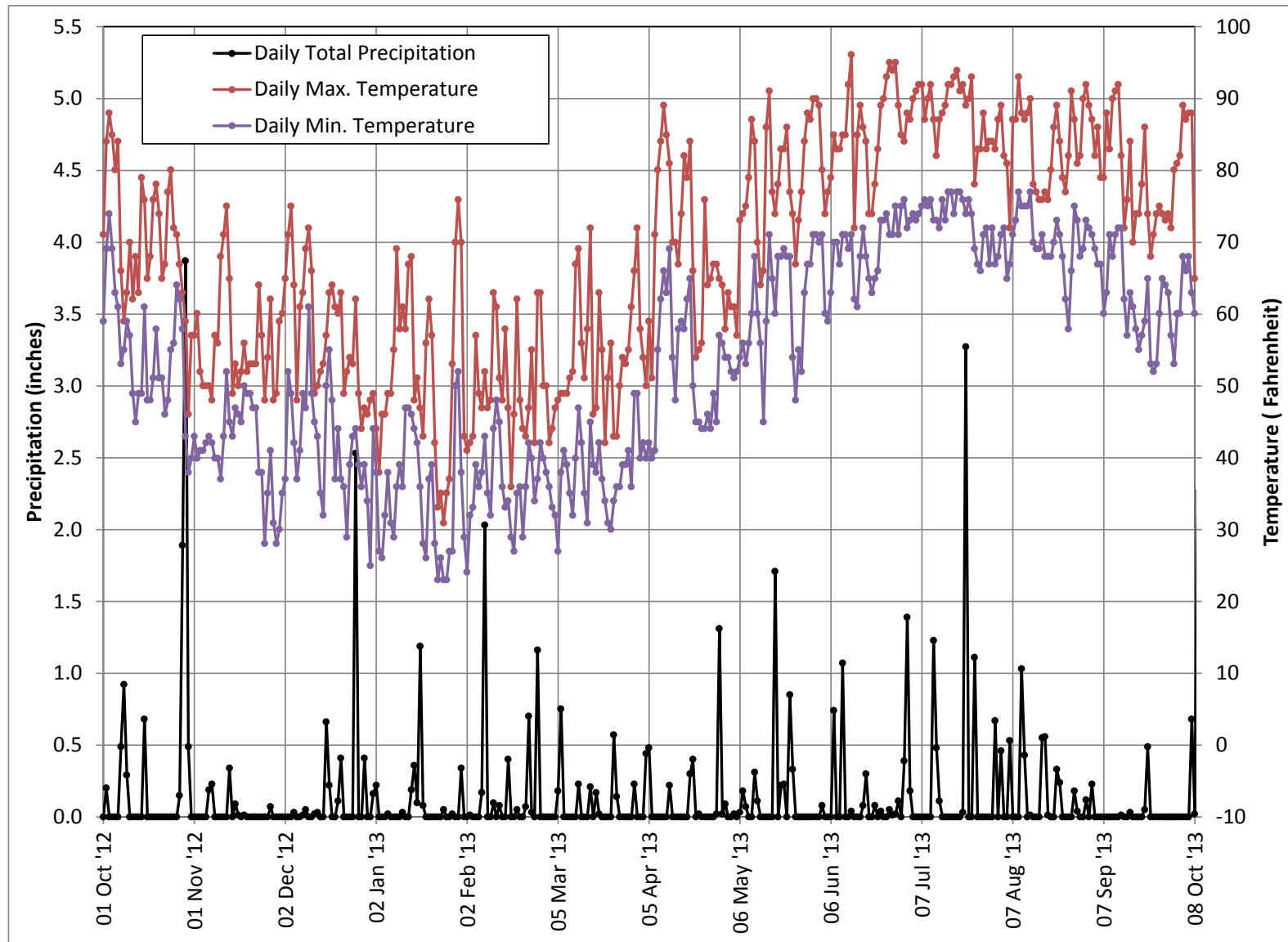


Figure 3: Rainfall and air temperature through the monitoring period



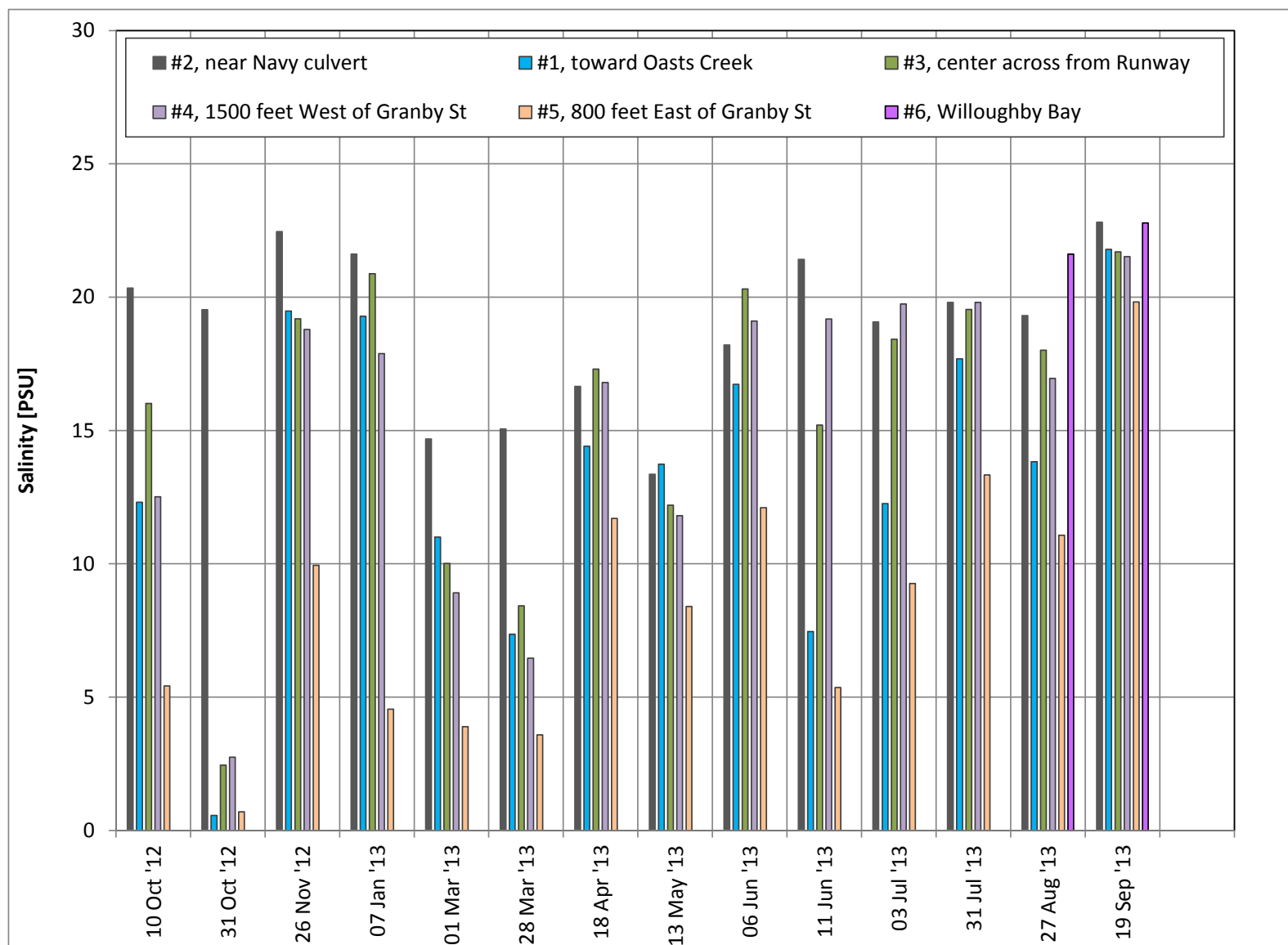


Figure 4: Salinity

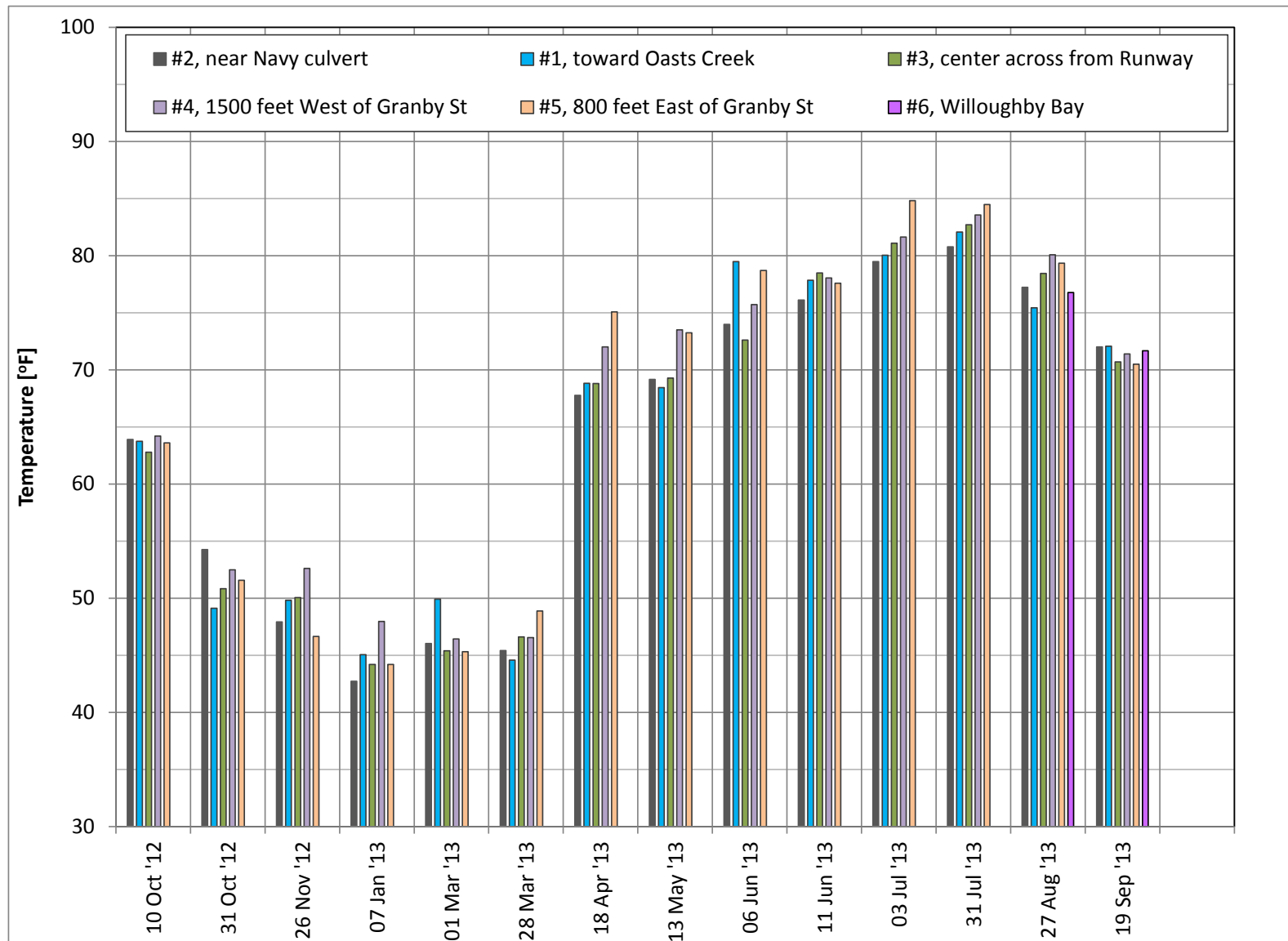


Figure 5: Water temperature

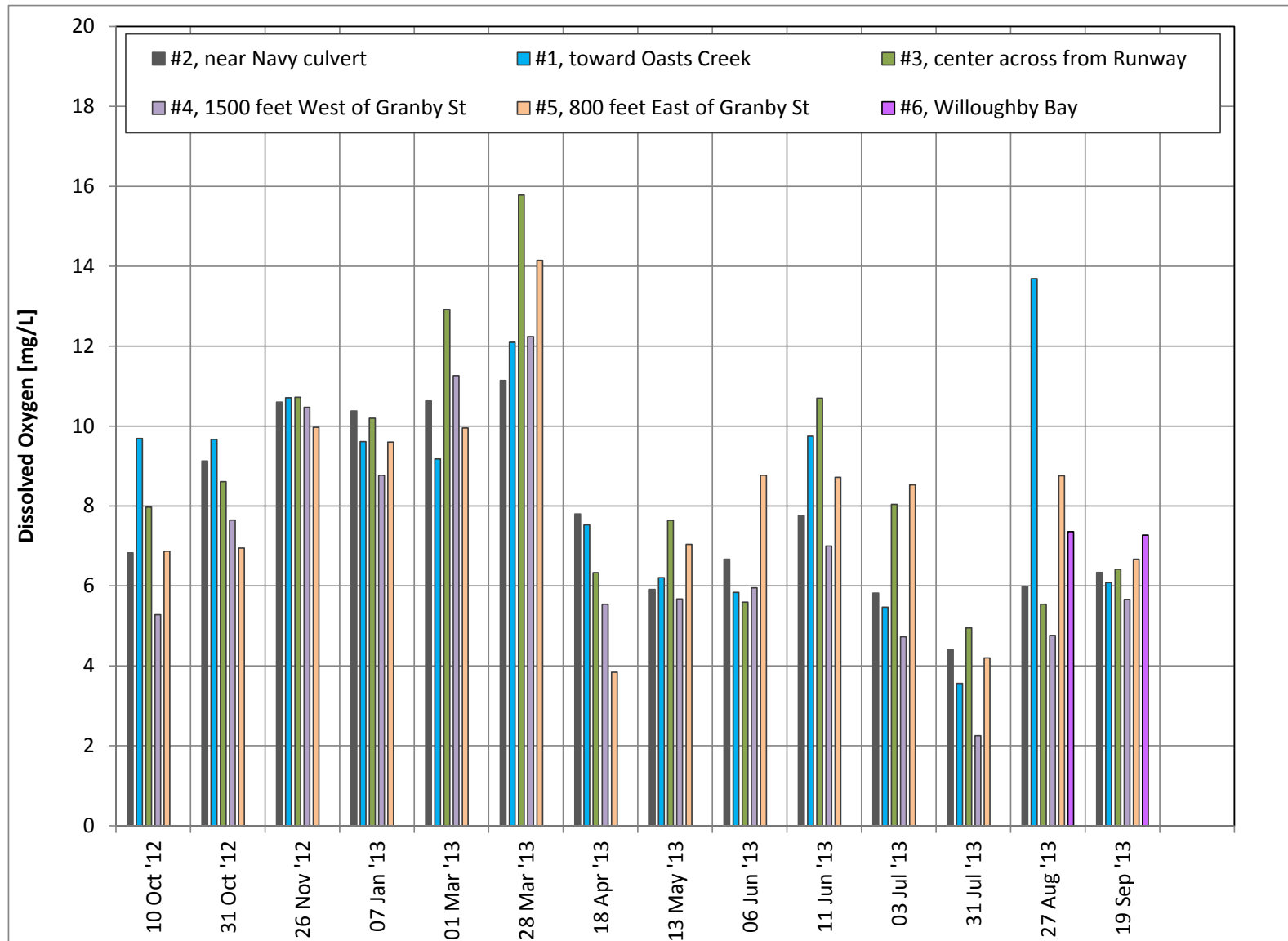


Figure 6: Dissolved oxygen concentration

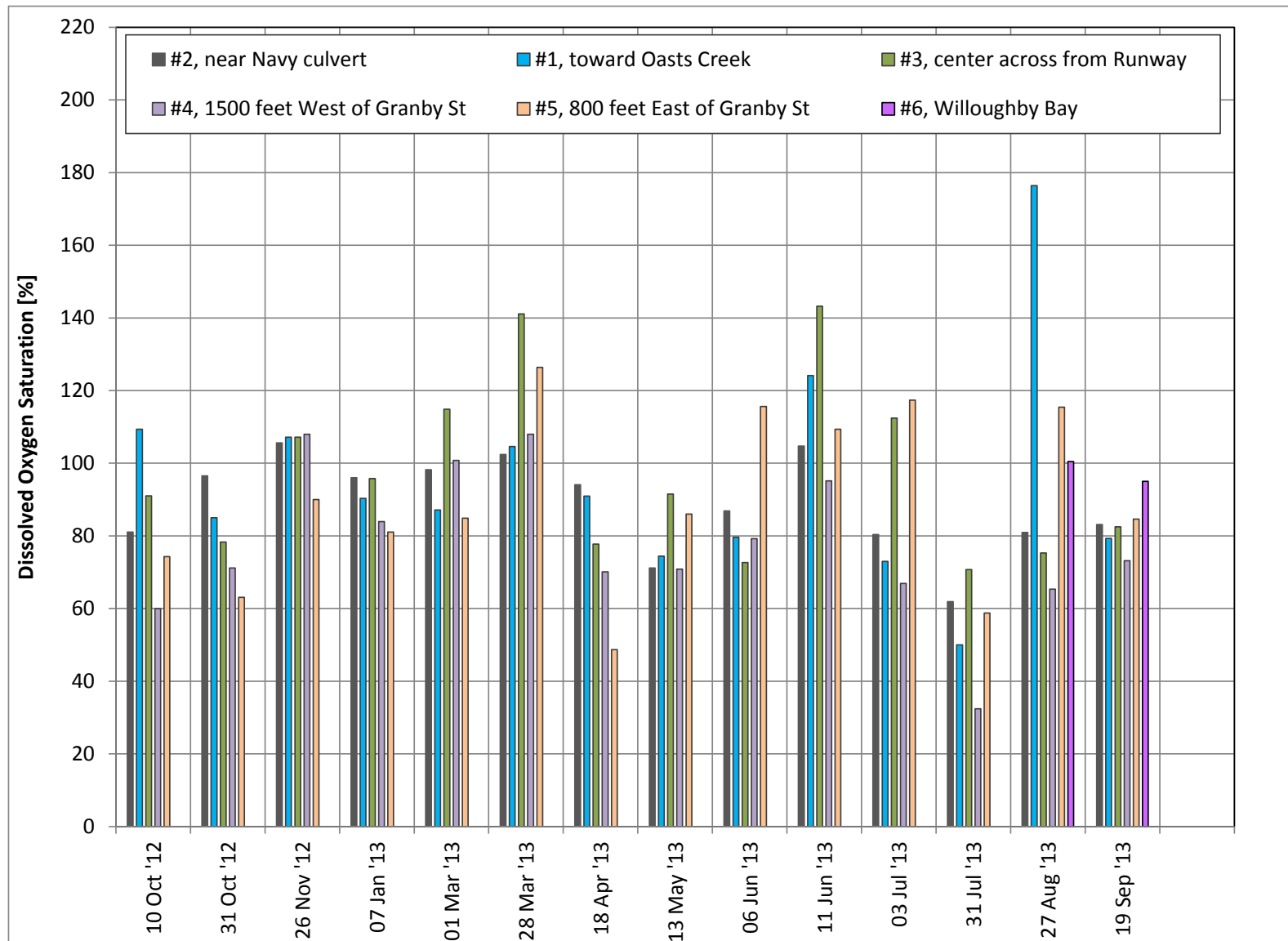


Figure 7: Dissolved oxygen saturation (calculated)



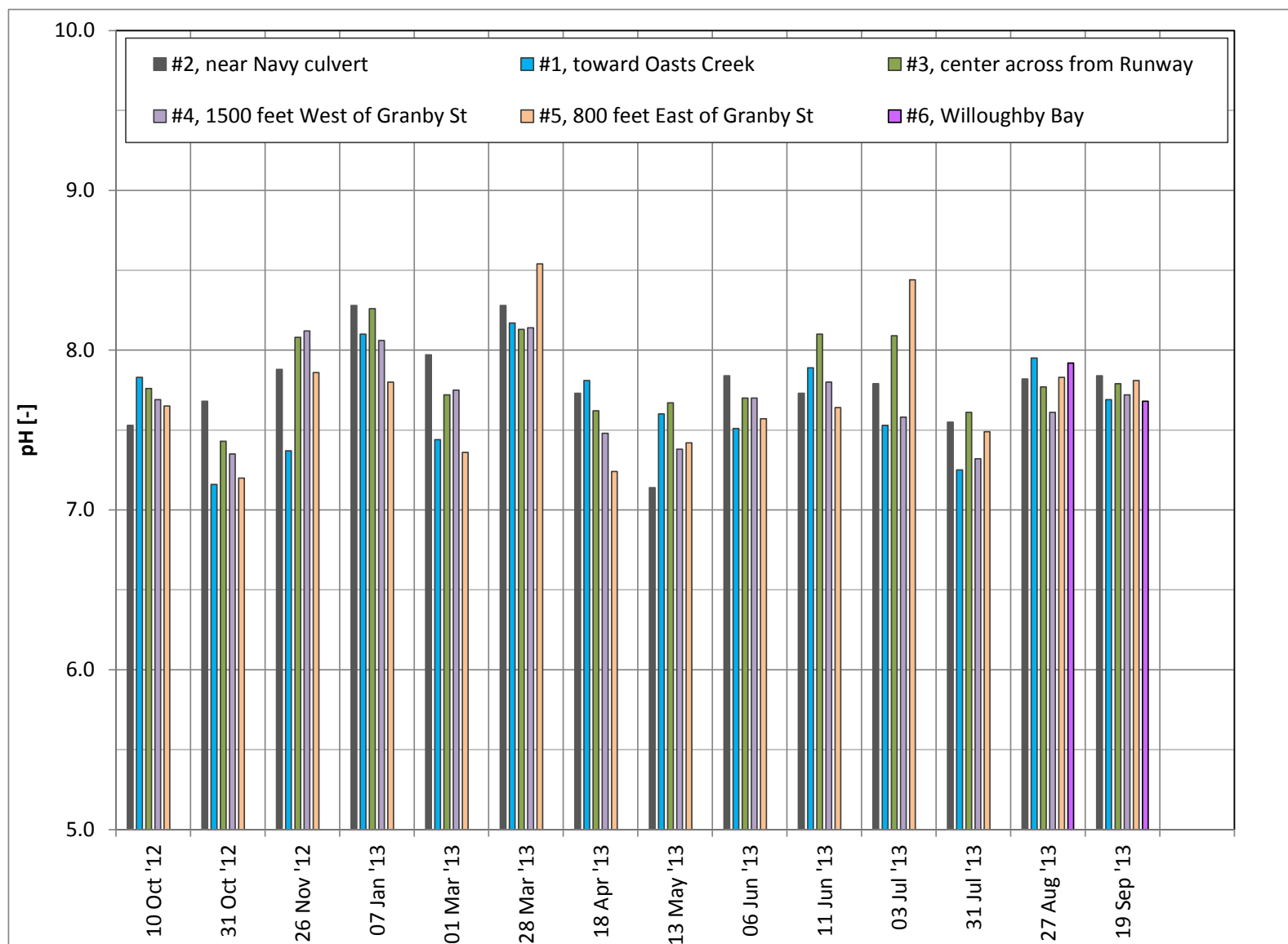


Figure 8: pH

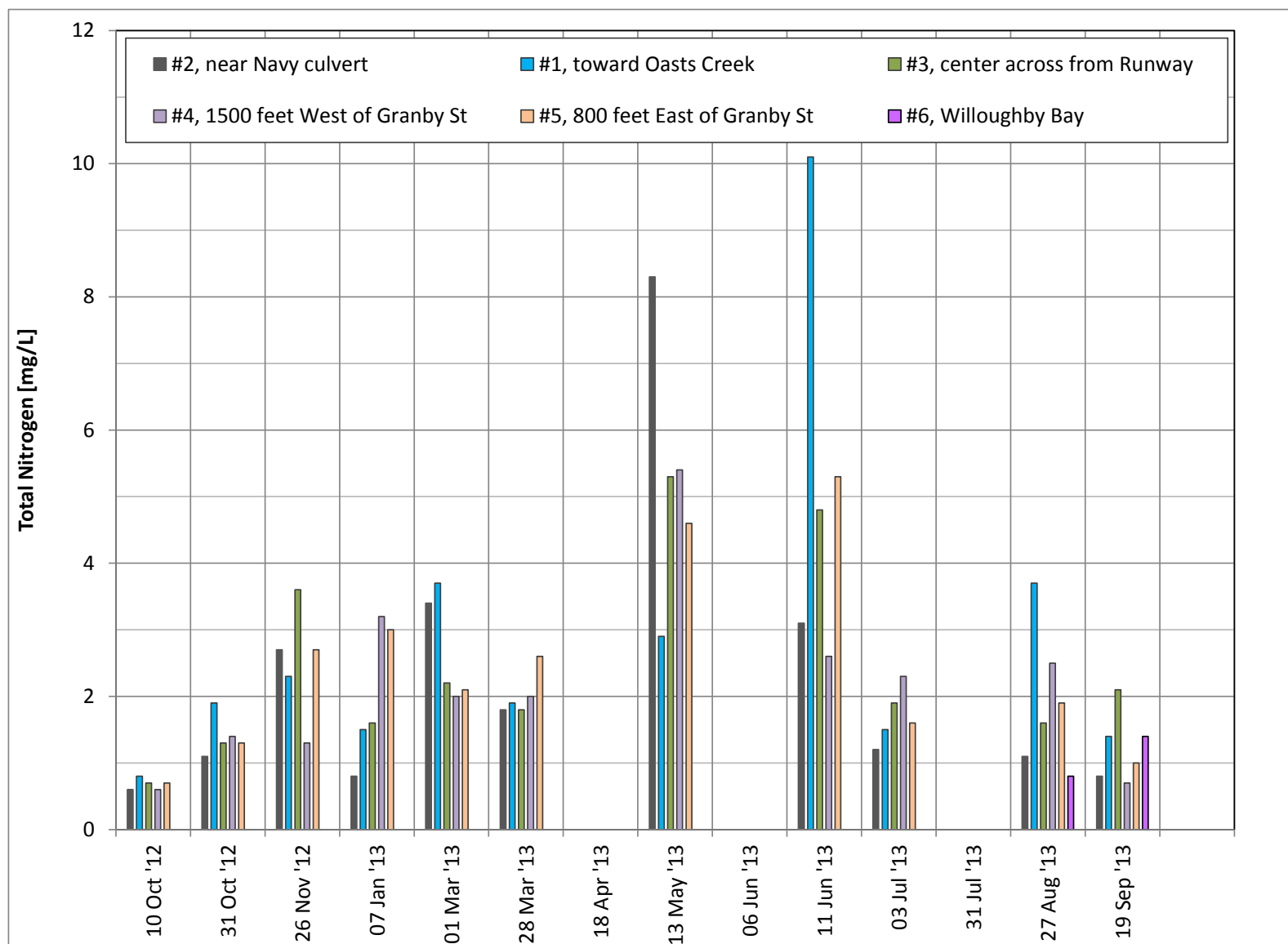


Figure 9: Total nitrogen concentration

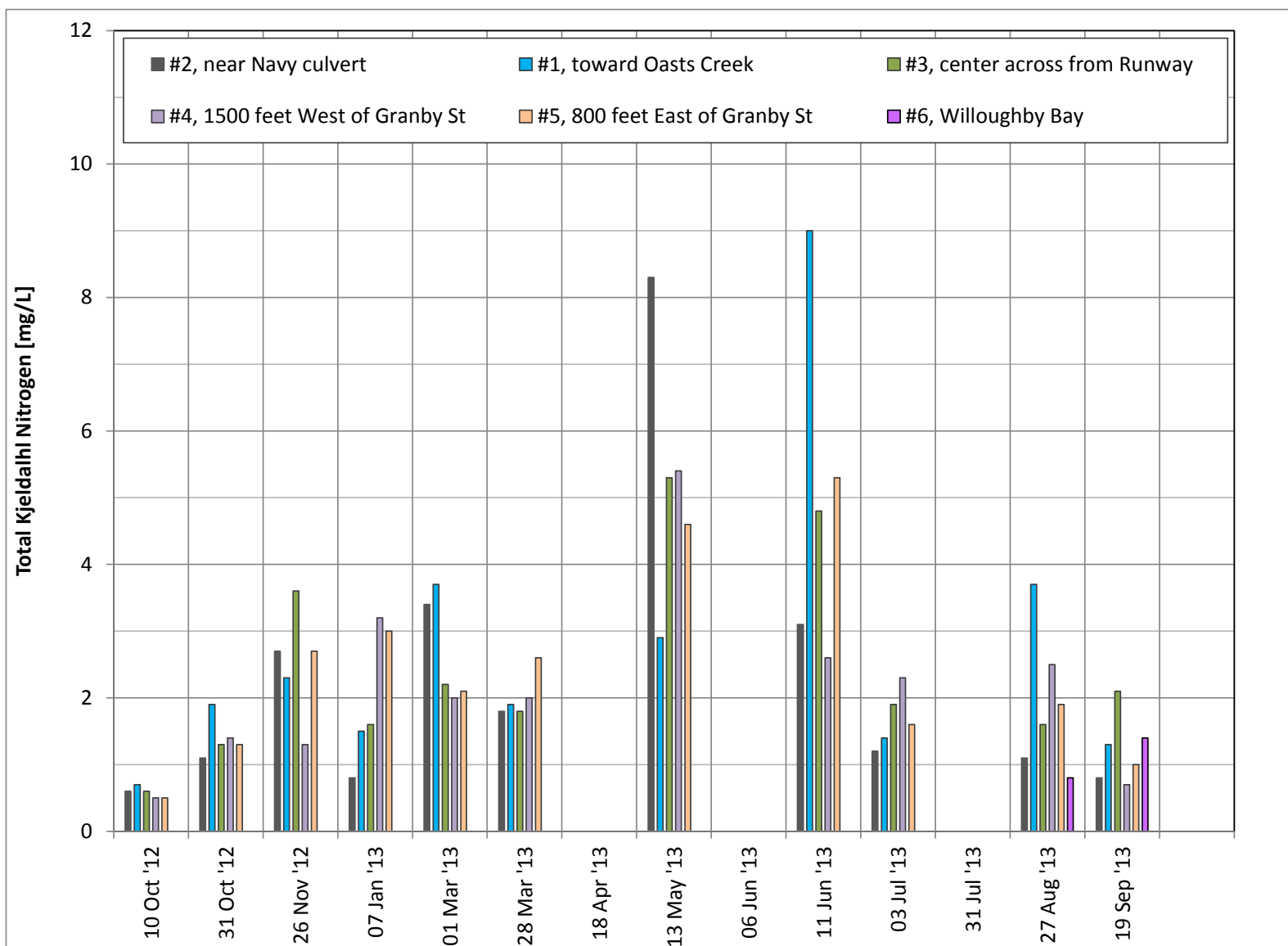


Figure 10: Total Kjeldahl nitrogen concentration

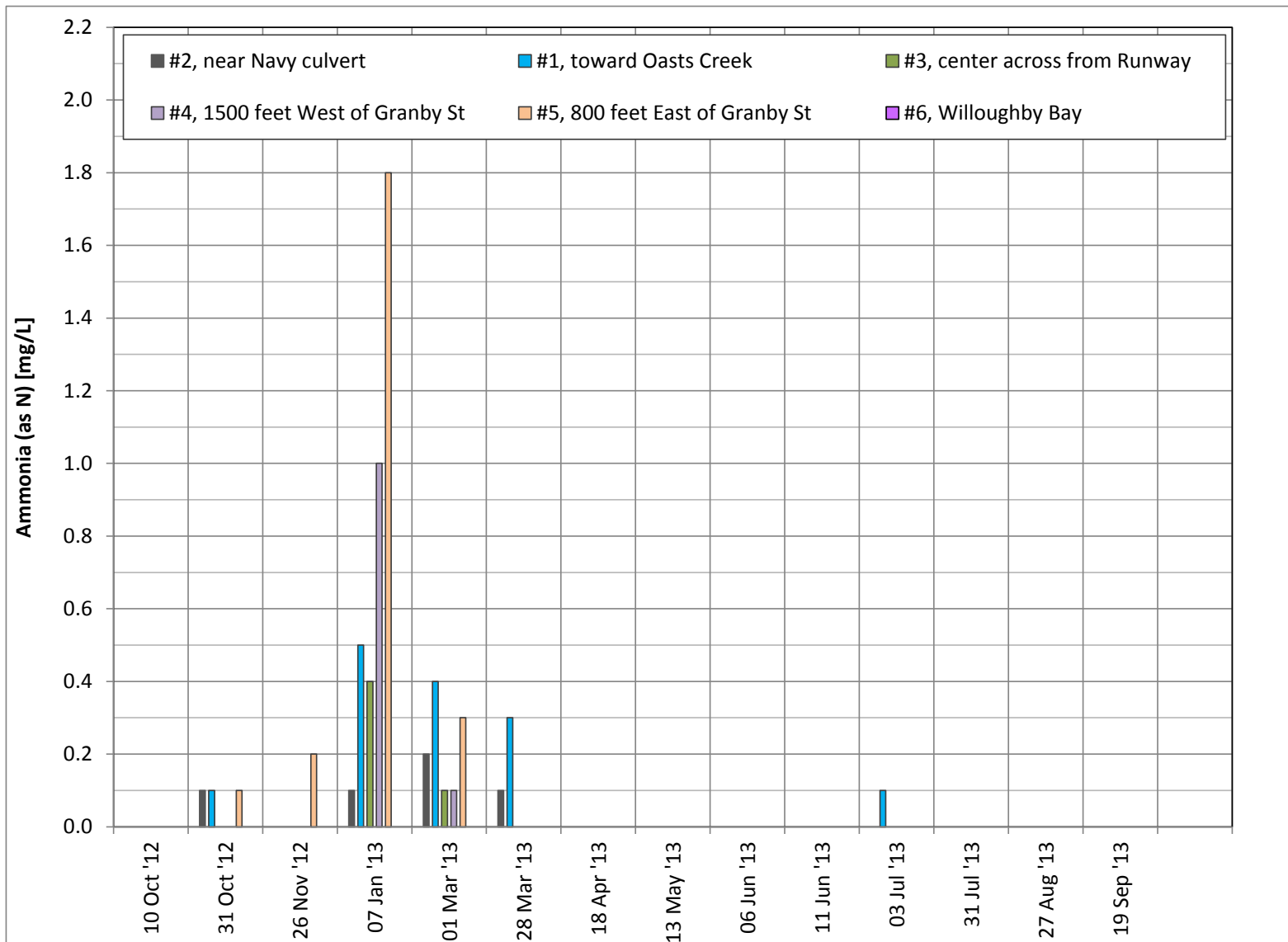


Figure 11: Ammonium concentration



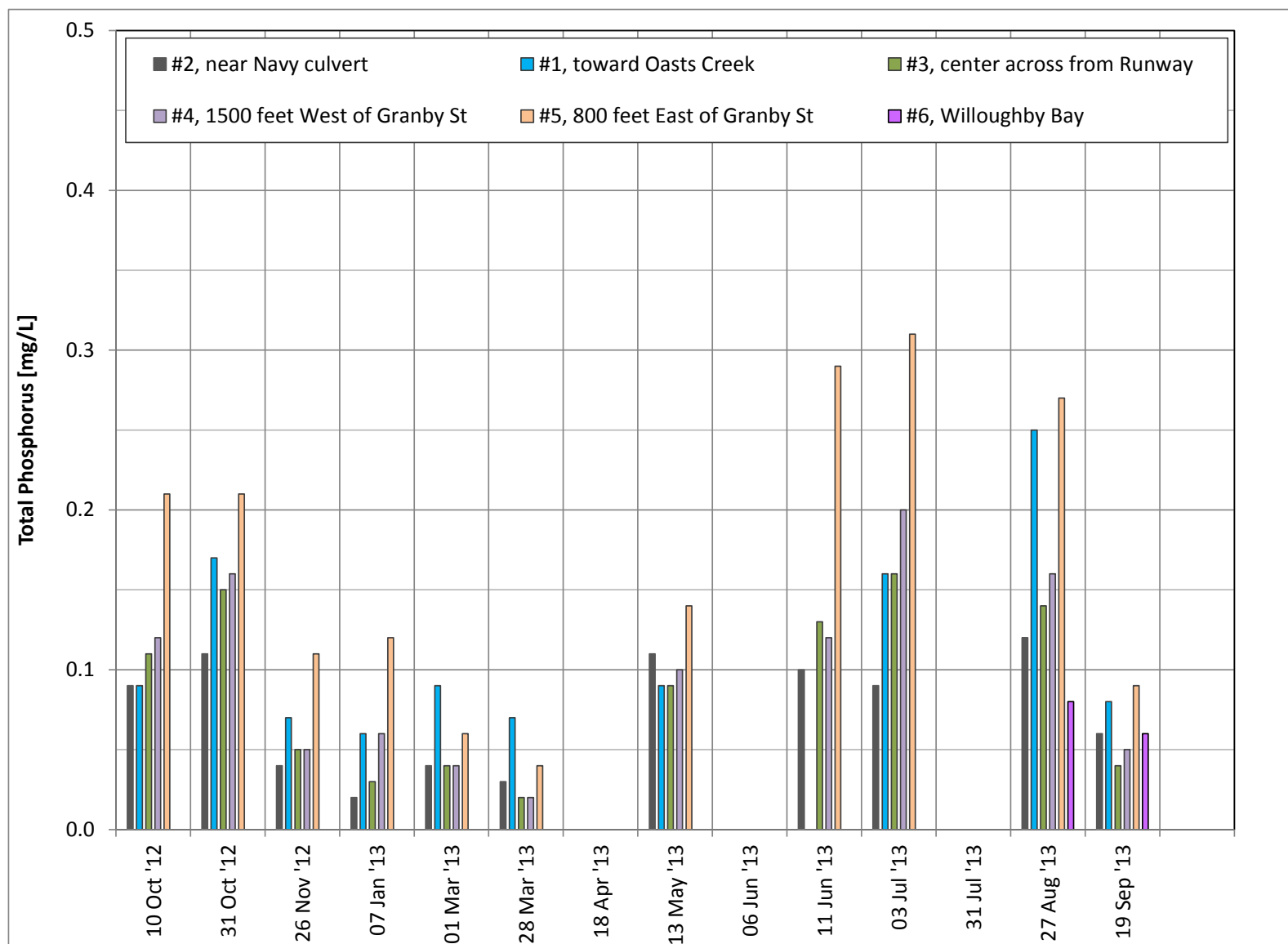


Figure 12: Total phosphorus concentration

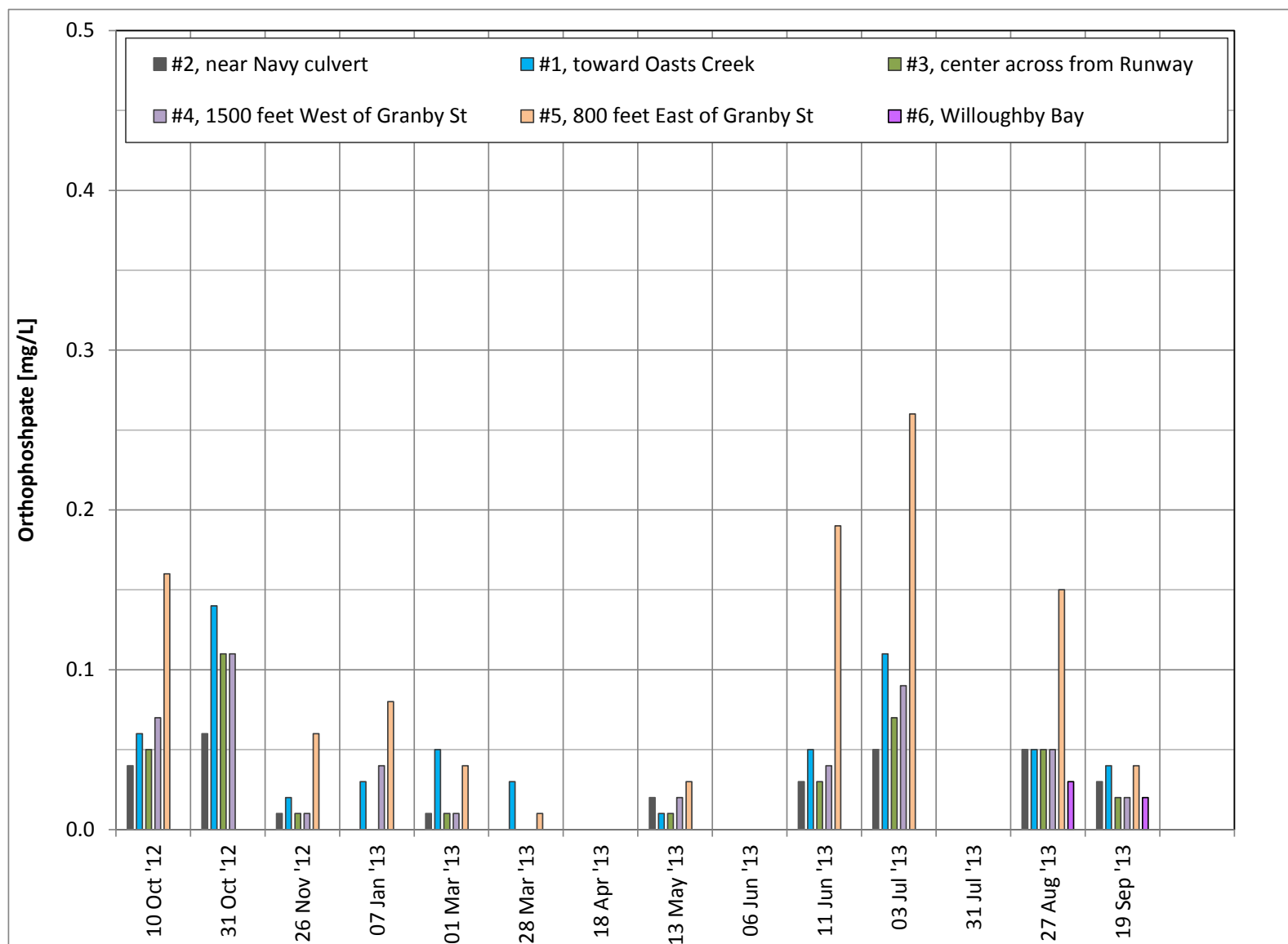


Figure 13: Orthophosphate (phosphate) concentration

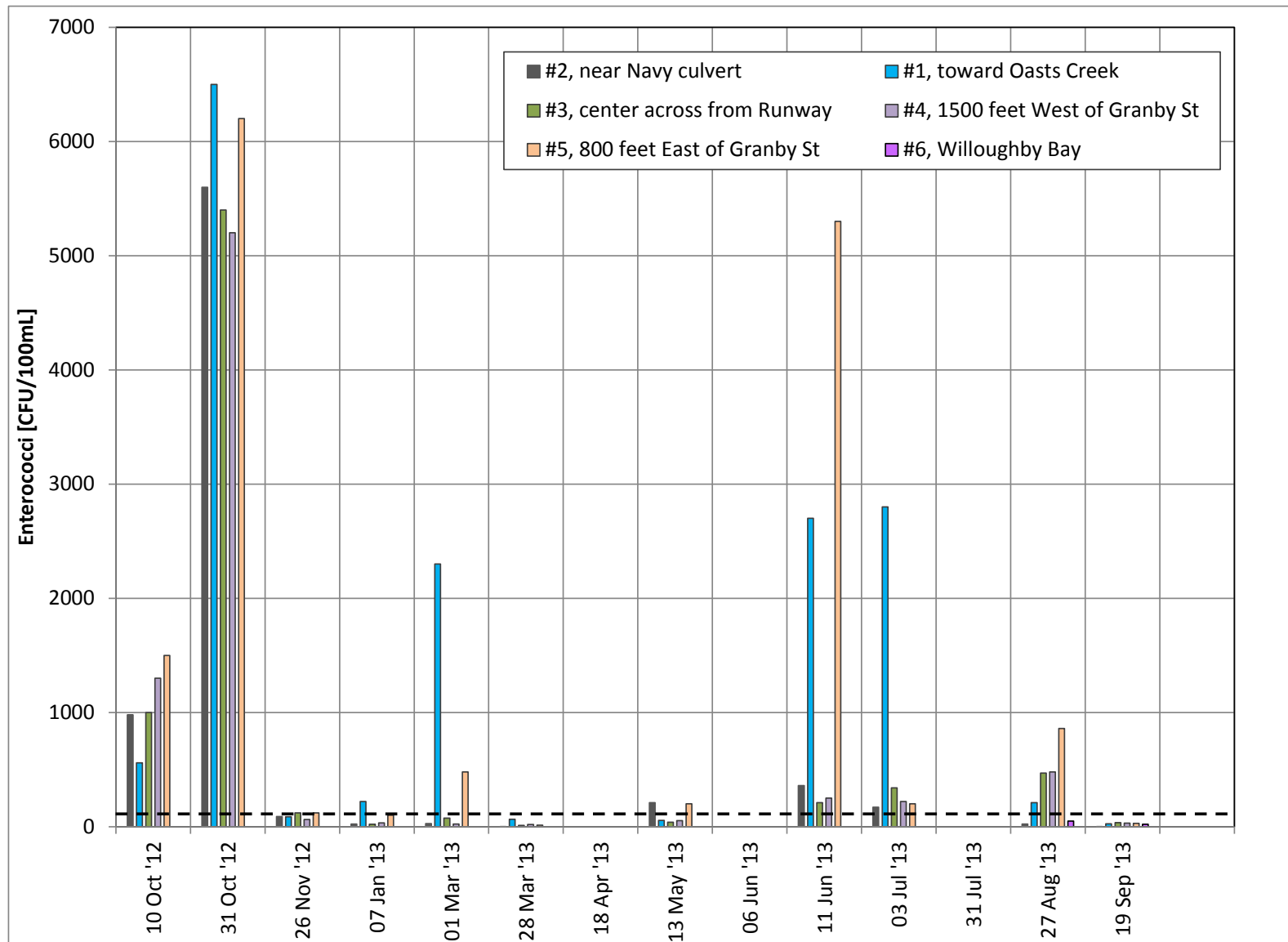


Figure 14: Enterococcus concentration

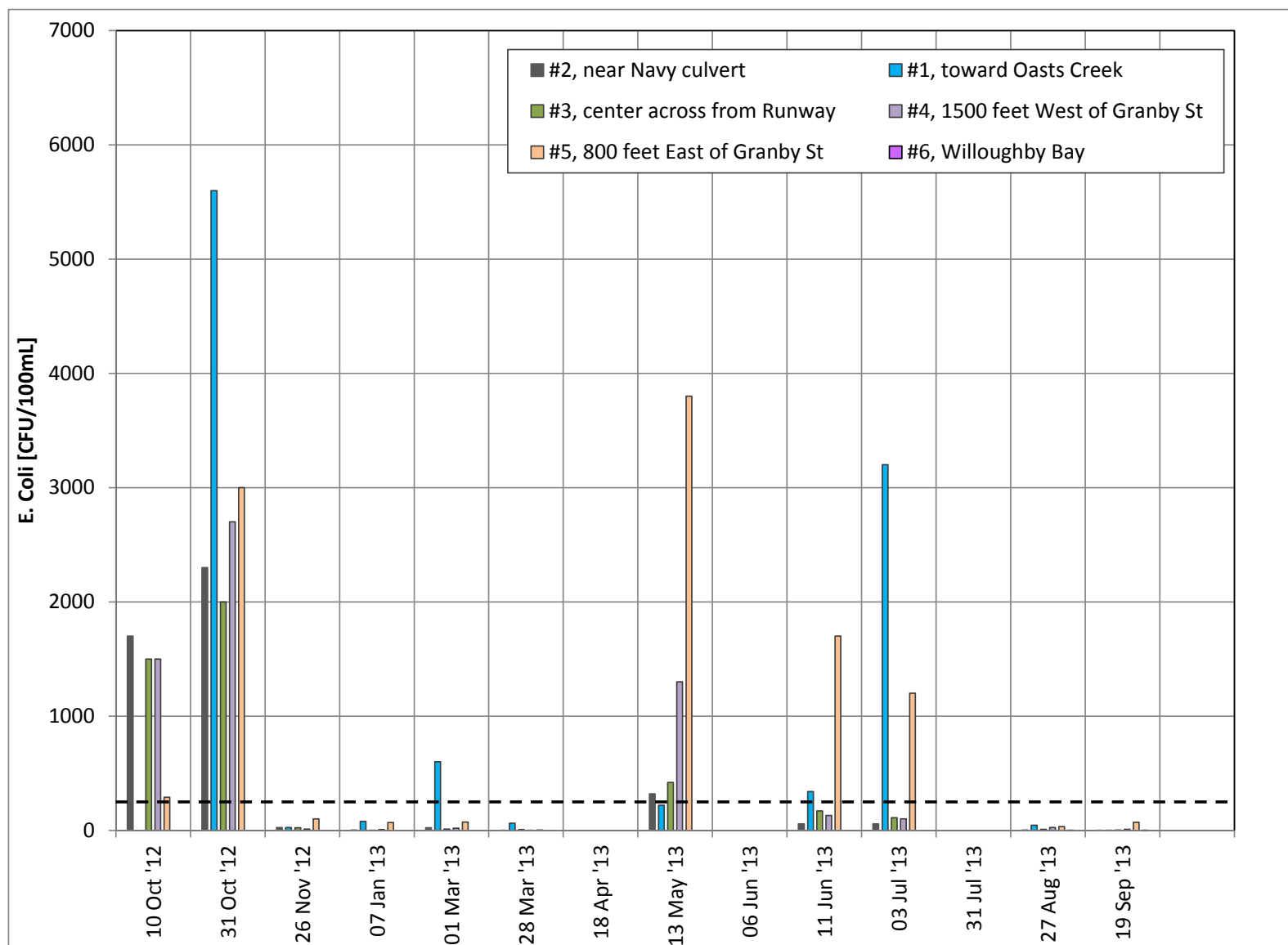


Figure 15: *E. coli* concentration



## 4. Conclusions

The field observations and water quality data have clearly indicated that at least two substantial algal blooms occurred during the 2013 growing season. Despite the two blooms, related water quality data recorded throughout the season yielded only one firm violation of Virginia water quality standards for DO, when DO levels at one site in late July fell below the VAC standard for daily instantaneous minimum DO of 3.2 mg/L. However, Mason Creek is certainly at risk for eutrophication events of greater severity. The March-April bloom, which exhibited the floating mats of algae and appeared to be severe, occurred during the cooler months of spring. Low DO levels such as the reading near 2.0 mg/L west of Granby Street and I-64 in July will rarely result in widespread harm to the fish community. Provided that the low DO levels are confined to a small portion of the water body, fish species may merely be temporarily stressed and will often simply move to areas of refuge where DO levels are more suitable. If water column DO were to decline to levels approaching 2.0 mg/L over a broad portion of the water body, a substantial fish kill could result.

Our review of Virginia water quality standards revealed no numeric criteria for nutrients or chlorophyll *a* directly applicable to Mason Creek (as a saline to brackish, semi-enclosed water body that is not a water reservoir). However, as a rule of thumb, the combined impact of total nitrogen levels greater than 1.0 mg/L and total phosphorus levels above 0.1 mg/L are sufficient to support eutrophic conditions in freshwater systems, provided that residence time, water temperature and sunlight are suitable. Such thresholds are not so steadfast for more saline waters, such as Mason Creek, but as with most urban to suburban impoundments, it is clear that nutrient loads to Mason Creek are sufficient to support nuisance algal blooms and the associated adverse consequences. Although the Chl-*a* measurements were not of use, calculations based on TKN concentrations observed in June indicate that algal concentrations indicative of eutrophic conditions could have existed in Mason Creek.

Measurements for two pathogen indicators (*E. coli* and *Enterococcus*) show that Mason Creek is at times in violation of VAC protective limits for direct contact activities (i.e. swimming). Additional discussion with City and state health agencies is warranted, for example to develop guidelines for use of Mason Creek for swimming and fishing.

In order to reduce risk levels in Mason Creek, it would be necessary to reduce nutrient and bacterial inputs to the system, or to alter the system's hydrodynamics to dilute bacterial concentrations and to render conditions less favorable for algal blooms. Based on the results of this study, Moffatt & Nichol recommends that the City consider both courses of action. Reducing non-point source nutrient and bacterial loads will involve retrofitting the largely built-out watershed with stormwater BMPs that will reduce such loads, a process that is admittedly challenging and expensive. Determining how to best alter and manage the somewhat complex hydrodynamics of the system is also challenging. Potential options include adding new connections to Willoughby Bay to improve flushing and potentially reduce residence time and/or installing submersible pumps at strategic locations within the creek to force circulation.

The effects of deepening Mason Creek (by dredging) on hydrodynamics and water quality are being investigated under a separate, ongoing work order. The water quality modeling and preliminary alternative design currently being performed by Moffatt & Nichol (under that separate work order) will shed light on the potential benefits of such management options.

Another hydrodynamic alteration that could be beneficial and should be considered involves basin-wide enhanced mixing/circulation through aeration. Mixing would not require new structures to increase flushing with bay water; rather, bubble aeration systems are used to circulate and mix water within the tidal creek. Such aeration systems consist of placing diffuser arrays along the bottom; air is pumped through the diffusers resulting in the release of massive numbers of very small bubbles which cause a vast amount of water movement. Most of the oxygen added to the water column is due to reaeration at the water surface rather than direct contact with the air bubbles. Bubble aeration systems rapidly circulate water throughout the water column resulting in much higher frequency of contact at the water surface, and thus more oxygen transfer through reaeration. Many of the negative consequences of eutrophic conditions can be abated by bubble aeration/circulation. Bottom sediments are more rapidly oxidized due to the presence of higher DO water in contact with the sediments. This oxidation helps reduce many of the harmful consequences of enriched organic bottom sediments. Enhanced circulation may not reduce the frequency or abundance of algal blooms in this system, but it will reduce the harmful impacts of such blooms by maintaining sufficient DO at all times. Enhanced circulation has been shown to cause changes in the types of algal communities present.

Appendix A: Water Quality Sampling Data Tables

Table A-1: Summary of sampling results at location #2

Parameter	Units	10/10 2012	10/31 2013	11/26 2012	1/7 2013	3/1 2013	3/28 2013	4/18 2013	5/13 2013	6/6 2013	6/11 2013	7/3 2013	7/31 2013	8/27 2013	9/19 2013
Time (local)	-	10:47	11:11	10:20	9:33	10:05	9:30	9:58	11:05	12:01	10:28	10:36	11:10	10:55	10:47
Tide, Sewells Point	-	low	high	mid to low	very low	near high	near high	low	near high	mid to low	near high	near low	near low	mid to high	high to mid
Tide, Mason Creek	-	low	very high	low	low	high	mid	mid to low	mid	-	-	-	-	-	high
Wind	Knots, Direction From	4-6 West	5-10 WSW	4-6 SW to NE	8-14 N to NNE	4-6 W to N	4-6 W to NW	8-12 SE to SW	8-10 N to NE	5-13 ESE to SE	7-13 SW	8-13 S to SSW	4-8 ESE to SE	5-10 SW to W	3-6 ENE to N
Rain, prev. 24 hours	inches	0	0	0	0	0	0	0	0	0	0.78	1.39	0	0	0
Rain, prev. 48 hours	inches	1.14	2.34	0	0	0	0	0	0	0	0.78	1.78	0	0	0
Rain, prev. 72 hours	inches	1.59	5.37	0	0.01	0.68	0	0	0.29	0	0.78	1.78	0	0.01	0.03
Ammonium (as N)	mg/L	BQL	0.1	BQL	0.1	0.2	0.1	-	BQL	-	BQL	BQL	-	BQL	BQL
Chlorophyll a	mg/m <sup>3</sup>	0.06	BQL	0.48	0.13	0.1	0.34	-	0.02	-	0.49	0.53	-	1.12	0.77
Dissolved Oxygen	mg/L	6.83	9.13	10.6	10.38	10.63	11.14	7.8	5.91	6.67	7.76	5.82	4.41	5.98	6.34
E. Coli	CFU/ 100mL	1700	2300	25	4	24	1	-	320	-	56	57	-	3	1
Enterococci	CFU/ 100mL	980	5600	89	24	28	1	-	210	-	360	170	-	23	1
Nitrate+Nitrite	mg/L	BQL	BQL	BQL	BQL	BQL	BQL	-	BQL	-	BQL	BQL	-	BQL	BQL
Orthophosphate	mg/L	0.04	0.06	0.01	BQL	0.01	BQL	-	0.02	-	0.03	0.05	-	0.05	0.03
pH	-	7.53	7.68	7.88	8.28	7.97	8.28	7.73	7.14	7.84	7.73	7.79	7.55	7.82	7.84
Phosphorus	mg/L	0.09	0.11	0.04	0.02	0.04	0.03	-	0.11	-	0.1	0.09	-	0.12	0.06
Salinity, calculated	PSU	20.3	19.5	22.5	21.6	14.7	-	15.4	13.4	18.2	20.1	19.0	19.7	19.3	22.8
Salinity, noted	PSU	-	19.5	22.3	21.3	14.6	15.1	16.7	13.3	18.2	21.4	19.1	19.8	19.3	22.8
Settleable Solids	mg/L	BQL	BQL	BQL	BQL	BQL	BQL	-	BQL	-	BQL	BQL	-	BQL	BQL
TKN	mg/L	0.6	1.1	2.7	0.8	3.4	1.8	-	8.3	-	3.1	1.2	-	1.1	0.8
TOC	mg/L	3.6	BQL	BQL	BQL	BQL	BQL	-	BQL	-	BQL	13.9	-	BQL	BQL
Total Nitrogen	mg/L	0.6	1.1	2.7	0.8	3.4	1.8	-	8.3	-	3.1	1.2	-	1.1	0.8
TSS	mg/L	5.7	3.9	7.5	2.5	9.4	4	-	11.4	-	16	12	-	44.3	26
Water Temperature	°C	17.7	12.4	8.9	6.0	7.8	7.5	19.9	20.6	23.3	24.5	26.4	27.1	25.1	22.2
Water Temperature	°F	63.9	54.3	47.9	42.7	46.0	45.4	67.8	69.2	74.0	76.1	79.5	80.8	77.2	72.0

BQL = Below Quantitation Level; result is less than laboratory’s Quantitation Limit and therefore the numeric value is not reported.

Table A-2: Summary of sampling results at location #1

Parameter	Units	10/10 2012	10/31 2013	11/26 2012	1/7 2013	3/1 2013	3/28 2013	4/18 2013	5/13 2013	6/6 2013	6/11 2013	7/3 2013	7/31 2013	8/27 2013	9/19 2013
Time (local)	-	10:23	10:56	9:58	9:15	9:43	9:47	10:28	10:48	11:38	10:03	10:22	10:53	10:39	10:23
Tide, Sewells Point	-	low	high	mid to low	very low	near high	near high	low	near high	mid to low	near high	near low	near low	mid to high	high to mid
Tide, Mason Creek	-	low	very high	low	low	high	mid	mid to low	mid	-	-	-	-	-	high
Wind	Knots, Direction From	4-6 West	5-10 WSW	4-6 SW to NE	8-14 N to NNE	4-6 W to N	4-6 W to NW	8-12 SE to SW	8-10 N to NE	5-13 ESE to SE	7-13 SW	8-13 S to SSW	4-8 ESE to SE	5-10 SW to W	3-6 ENE to N
Rain, prev. 24 hours	inches	0	0	0	0	0	0	0	0	0	0.78	1.39	0	0	0
Rain, prev. 48 hours	inches	1.14	2.34	0	0	0	0	0	0	0	0.78	1.78	0	0	0
Rain, prev. 72 hours	inches	1.59	5.37	0	0.01	0.68	0	0	0.29	0	0.78	1.78	0	0.01	0.03
Ammonium (as N)	mg/L	BQL	0.1	BQL	0.5	0.4	0.3	-	BQL	-	BQL	0.1	-	BQL	BQL
Chlorophyll a	mg/m <sup>3</sup>	0.26	BQL	0.4	0.16	0.05	BQL	-	0.01	-	3.05	0.53	-	3.27	1.61
Dissolved Oxygen	mg/L	9.69	9.67	10.71	9.61	9.18	12.1	7.53	6.21	5.84	9.75	5.47	3.56	13.69	6.08
E. Coli	CFU/ 100mL	BQL	5600	25	79	600	62	-	220	-	340	3200	-	46	1
Enterococci	CFU/ 100mL	560	6500	87	220	2300	65	-	55	-	2700	2800	-	210	25
Nitrate+Nitrite	mg/L	0.1	BQL	BQL	BQL	BQL	BQL	-	BQL	-	1.1	0.1	-	BQL	0.11
Orthophosphate	mg/L	0.06	0.14	0.02	0.03	0.05	0.03	-	0.01	-	0.05	0.11	-	0.05	0.04
pH	-	7.83	7.16	7.37	8.1	7.44	8.17	7.81	7.6	7.51	7.89	7.53	7.25	7.95	7.69
Phosphorus	mg/L	0.09	0.17	0.07	0.06	0.09	0.07	-	0.09	-	BQL	0.16	-	0.25	0.08
Salinity, calculated	PSU	12.3		19.4	19.3	11.0	-	14.4	13.7	16.7	7.4	11.4	17.7	13.8	21.8
Salinity, noted	PSU	-	0.6	19.5	19.1	11.0	7.4	14.3	13.7	16.7	7.5	12.3	17.6	13.8	21.8
Settleable Solids	mg/L	BQL	BQL	BQL	BQL	BQL	BQL	-	5.5	-	BQL	BQL	-	0.1	BQL
TKN	mg/L	0.7	1.9	2.3	1.5	3.7	1.9	-	2.9	-	9	1.4	-	3.7	1.3
TOC	mg/L	4	BQL	BQL	BQL	BQL	BQL	-	BQL	-	1.2	4.1	-	BQL	42.8
Total Nitrogen	mg/L	0.8	1.9	2.3	1.5	3.7	1.9	-	2.9	-	10.1	1.5	-	3.7	1.4
TSS	mg/L	5.5	4.7	7.2	21.2	4.8	3.1	-	40.3	-	46.5	23.8	-	46	21.1
Water Temperature	°C	17.6	9.5	9.9	7.3	10.0	7.0	20.5	20.2	26.4	25.5	26.7	27.8	24.1	22.3
Water Temperature	°F	63.7	49.1	49.8	45.1	49.9	44.6	68.8	68.4	79.5	77.8	80.0	82.1	75.4	72.1

BQL = Below Quantitation Level; result is less than laboratory's Quantitation Limit and therefore the numeric value is not reported.

Table A-3: Summary of sampling results at location #3

Parameter	Units	10/10 2012	10/31 2013	11/26 2012	1/7 2013	3/1 2013	3/28 2013	4/18 2013	5/13 2013	6/6 2013	6/11 2013	7/3 2013	7/31 2013	8/27 2013	9/19 2013
Time (local)	-	11:05	11:26	10:35	9:00	9:30	9:58	10:44	11:18	12:20	11:05	10:48	11:28	11:10	11:05
Tide, Sewells Point	-	low	high	mid to low	very low	near high	near high	low	near high	mid to low	near high	near low	near low	mid to high	high to mid
Tide, Mason Creek	-	low	very high	low	low	high	mid	mid to low	mid	-	-	-	-	-	high
Wind	Knots, Direction From	4-6 West	5-10 WSW	4-6 SW to NE	8-14 N to NNE	4-6 W to N	4-6 W to NW	8-12 SE to SW	8-10 N to NE	5-13 ESE to SE	7-13 SW	8-13 S to SSW	4-8 ESE to SE	5-10 SW to W	3-6 ENE to N
Rain, prev. 24 hours	inches	0	0	0	0	0	0	0	0	0	0.78	1.39	0	0	0
Rain, prev. 48 hours	inches	1.14	2.34	0	0	0	0	0	0	0	0.78	1.78	0	0	0
Rain, prev. 72 hours	inches	1.59	5.37	0	0.01	0.68	0	0	0.29	0	0.78	1.78	0	0.01	0.03
Ammonium (as N)	mg/L	BQL	BQL	BQL	0.4	0.1	BQL	-	BQL	-	BQL	BQL	-	BQL	BQL
Chlorophyll a	mg/m <sup>3</sup>	0.35	BQL	0.43	0.08	0.12	0.18	-	0.01	-	1.48	2.54	-	0.4	0.88
Dissolved Oxygen	mg/L	7.97	8.61	10.72	10.2	12.92	15.78	6.33	7.64	5.59	10.7	8.04	4.95	5.54	6.42
E. Coli	CFU/ 100mL	1500	2000	23	1	11	7	-	420	-	170	110	-	10	3
Enterococci	CFU/ 100mL	1000	5400	120	22	74	11	-	40	-	210	340	-	470	36
Nitrate+Nitrite	mg/L	0.1	BQL	BQL	BQL	BQL	BQL	-	BQL	-	BQL	BQL	-	BQL	BQL
Orthophosphate	mg/L	0.05	0.11	0.01	BQL	0.01	BQL	-	0.01	-	0.03	0.07	-	0.05	0.02
pH	-	7.76	7.43	8.08	8.26	7.72	8.13	7.62	7.67	7.7	8.1	8.09	7.61	7.77	7.79
Phosphorus	mg/L	0.11	0.15	0.05	0.03	0.04	0.02	-	0.09	-	0.13	0.16	-	0.14	0.04
Salinity, calculated	PSU	16.0	2.4	18.3	20.9	10.0	-	17.3	12.2	20.3	15.2	18.4	19.5	18.0	21.6
Salinity, noted	PSU	-	2.5	19.2	20.7	10.0	8.4	17.3	12.2	20.3	15.2	18.4	19.5	17.9	21.7
Settleable Solids	mg/L	BQL	BQL	BQL	BQL	BQL	BQL	-	BQL	-	BQL	BQL	-	BQL	BQL
TKN	mg/L	0.6	1.3	3.6	1.6	2.2	1.8	-	5.3	-	4.8	1.9	-	1.6	2.1
TOC	mg/L	7.9	BQL	BQL	BQL	BQL	BQL	-	BQL	-	8.9	BQL	-	BQL	BQL
Total Nitrogen	mg/L	0.7	1.3	3.6	1.6	2.2	1.8	-	5.3	-	4.8	1.9	-	1.6	2.1
TSS	mg/L	5.7	2.9	6	3.8	4.2	3.7	-	20	-	21.3	18.2	-	39.1	15.5
Water Temperature	°C	17.1	10.5	10.0	6.8	7.4	8.1	20.4	20.7	22.6	25.8	27.3	28.2	25.8	21.5
Water Temperature	°F	62.8	50.8	50.1	44.2	45.4	46.6	68.8	69.3	72.6	78.5	81.1	82.7	78.4	70.7

BQL = Below Quantitation Level; result is less than laboratory's Quantitation Limit and therefore the numeric value is not reported.

Table A-4: Summary of sampling results at location #4

Parameter	Units	10/10 2012	10/31 2013	11/26 2012	1/7 2013	3/1 2013	3/28 2013	4/18 2013	5/13 2013	6/6 2013	6/11 2013	7/3 2013	7/31 2013	8/27 2013	9/19 2013
Time (local)	-	11:15	11:35	10:49	9:55	10:30	10:12	10:59	11:26	12:33	11:20	10:56	11:38	11:22	11:15
Tide, Sewells Point	-	low	high	mid to low	very low	near high	near high	low	near high	mid to low	near high	near low	near low	mid to high	high to mid
Tide, Mason Creek	-	low	very high	low	low	high	mid	mid to low	mid	-	-	-	-	-	high
Wind	Knots, Direction From	4-6 West	5-10 WSW	4-6 SW to NE	8-14 N to NNE	4-6 W to N	4-6 W to NW	8-12 SE to SW	8-10 N to NE	5-13 ESE to SE	7-13 SW	8-13 S to SSW	4-8 ESE to SE	5-10 SW to W	3-6 ENE to N
Rain, prev. 24 hours	inches	0	0	0	0	0	0	0	0	0	0.78	1.39	0	0	0
Rain, prev. 48 hours	inches	1.14	2.34	0	0	0	0	0	0	0	0.78	1.78	0	0	0
Rain, prev. 72 hours	inches	1.59	5.37	0	0.01	0.68	0	0	0.29	0	0.78	1.78	0	0.01	0.03
Ammonium (as N)	mg/L	BQL	BQL	BQL	1	0.1	BQL	-	BQL	-	BQL	BQL	-	BQL	BQL
Chlorophyll a	mg/m <sup>3</sup>	0.1	BQL	0.5	0.05	0.17	0.13	-	0.02	-	1.44	1.63	-	1.36	0.26
Dissolved Oxygen	mg/L	5.28	7.65	10.47	8.77	11.26	12.24	5.54	5.67	5.95	7	4.73	2.25	4.76	5.66
E. Coli	CFU/ 100mL	1500	2700	12	8	20	1	-	1300	-	130	100	-	25	9
Enterococci	CFU/ 100mL	1300	5200	63	34	24	20	-	54	-	250	220	-	480	31
Nitrate+Nitrite	mg/L	0.1	BQL	BQL	BQL	BQL	BQL	-	BQL	-	BQL	BQL	-	BQL	BQL
Orthophosphate	mg/L	0.07	0.11	0.01	0.04	0.01	BQL	-	0.02	-	0.04	0.09	-	0.05	0.02
pH	-	7.69	7.35	8.12	8.06	7.75	8.14	7.48	7.38	7.7	7.8	7.58	7.32	7.61	7.72
Phosphorus	mg/L	0.12	0.16	0.05	0.06	0.04	0.02	-	0.1	-	0.12	0.2	-	0.16	0.05
Salinity, calculated	PSU	12.5	2.8	18.8	17.9	8.9	-	16.5	11.8	19.1	18.1	19.5	19.6	17.0	21.5
Salinity, noted	PSU	-	2.5	18.6	14.4	8.9	6.5	16.8	11.8	19.1	19.2	19.7	19.8	16.9	21.5
Settleable Solids	mg/L	BQL	BQL	BQL	BQL	BQL	BQL	-	BQL	-	BQL	BQL	-	BQL	BQL
TKN	mg/L	0.5	1.4	1.3	3.2	2	2	-	5.4	-	2.6	2.3	-	2.5	0.7
TOC	mg/L	5.7	BQL	BQL	10.3	BQL	BQL	-	BQL	-	5.1	BQL	-	BQL	BQL
Total Nitrogen	mg/L	0.6	1.4	1.3	3.2	2	2	-	5.4	-	2.6	2.3	-	2.5	0.7
TSS	mg/L	7.1	3.4	5	4.2	4	5	-	10.1	-	18.3	85	-	57.1	19
Water Temperature	°C	17.9	11.4	11.5	8.9	8.0	8.1	22.2	23.1	24.3	25.6	27.6	28.6	26.7	21.9
Water Temperature	°F	64.2	52.5	52.6	48.0	46.4	46.5	72.0	73.5	75.7	78.0	81.6	83.6	80.1	71.4

BQL = Below Quantitation Level; result is less than laboratory's Quantitation Limit and therefore the numeric value is not reported.

Table A-5: Summary of sampling results at location #5

Parameter	Units	10/10 2012	10/31 2013	11/26 2012	1/7 2013	3/1 2013	3/28 2013	4/18 2013	5/13 2013	6/6 2013	6/11 2013	7/3 2013	7/31 2013	8/27 2013	9/19 2013
Time (local)	-	11:45	12:01	11:19	10:27	10:55	10:39	12:00	11:50	11:03	11:52	11:12	11:53	11:49	11:45
Tide, Sewells Point	-	low	high	mid to low	very low	near high	near high	low	near high	mid to low	near high	near low	near low	mid to high	high to mid
Tide, Mason Creek	-	low	very high	low	low	high	mid	mid to low	mid	-	-	-	-	-	high
Wind	Knots, Direction From	4-6 West	5-10 WSW	4-6 SW to NE	8-14 N to NNE	4-6 W to N	4-6 W to NW	8-12 SE to SW	8-10 N to NE	5-13 ESE to SE	7-13 SW	8-13 S to SSW	4-8 ESE to SE	5-10 SW to W	3-6 ENE to N
Rain, prev. 24 hours	inches	0	0	0	0	0	0	0	0	0	0.78	1.39	0	0	0
Rain, prev. 48 hours	inches	1.14	2.34	0	0	0	0	0	0	0	0.78	1.78	0	0	0
Rain, prev. 72 hours	inches	1.59	5.37	0	0.01	0.68	0	0	0.29	0	0.78	1.78	0	0.01	0.03
Ammonium (as N)	mg/L	BQL	0.1	0.2	1.8	0.3	BQL	-	BQL	-	BQL	BQL	-	BQL	BQL
Chlorophyll a	mg/m <sup>3</sup>	BQL	BQL	0.36	0.21	0.05	0.06	-	0.03	-	2.97	1.59	-	2.33	1.02
Dissolved Oxygen	mg/L	6.87	6.95	9.97	9.6	9.95	14.15	3.84	7.04	8.77	8.72	8.53	4.2	8.76	6.67
E. Coli	CFU/ 100mL	290	3000	100	69	73	3	-	3800	-	1700	1200	-	33	71
Enterococci	CFU/ 100mL	1500	6200	120	100	480	13	-	200	-	5300	200	-	860	30
Nitrate+Nitrite	mg/L	0.2	BQL	BQL	BQL	BQL	BQL	-	BQL	-	BQL	BQL	-	BQL	BQL
Orthophosphate	mg/L	0.16	BQL	0.06	0.08	0.04	0.01	-	0.03	-	0.19	0.26	-	0.15	0.04
pH	-	7.65	7.2	7.86	7.8	7.36	8.54	7.24	7.42	7.57	7.64	8.44	7.49	7.83	7.81
Phosphorus	mg/L	0.21	0.21	0.11	0.12	0.06	0.04	-	0.14	-	0.29	0.31	-	0.27	0.09
Salinity, calculated	PSU	5.4	-	9.9	4.6	3.9	-	11.6	8.4	12.1	5.1	9.3	13.3	11.1	19.8
Salinity, noted	PSU	-	0.7	9.6	4.6	3.9	3.6	11.7	8.4	12.1	5.4	9.1	12.1	10.8	19.8
Settleable Solids	mg/L	BQL	BQL	BQL	BQL	BQL	BQL	-	BQL	-	0.3	BQL	-	BQL	BQL
TKN	mg/L	0.5	1.3	2.7	3	2.1	2.6	-	4.6	-	5.3	1.6	-	1.9	1
TOC	mg/L	4.4	BQL	BQL	BQL	BQL	BQL	-	BQL	-	5.6	BQL	-	BQL	BQL
Total Nitrogen	mg/L	0.7	1.3	2.7	3	2.1	2.6	-	4.6	-	5.3	1.6	-	1.9	1
TSS	mg/L	4.2	4.1	4.4	11.2	3.7	4.6	-	10.5	-	50	8.2	-	40	21.2
Water Temperature	°C	17.6	10.9	8.1	6.8	7.4	9.4	23.9	22.9	25.9	25.3	29.3	29.2	26.3	21.4
Water Temperature	°F	63.6	51.6	46.7	44.2	45.3	48.9	75.1	73.2	78.7	77.6	84.8	84.5	79.3	70.5

BQL = Below Quantitation Level; result is less than laboratory's Quantitation Limit and therefore the numeric value is not reported.



## Appendix B: Laboratory Reports



## Analytical Summary

Enviro Compliance Laboratories, Inc.  
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Norfolk, Virginia 23509

Project Name : Mason Creek WQ Study  
Date Received: October 10, 2012  
Date Sampled : October 10, 2012  
Time Sampled : 10:40  
Date Issued : October 23, 2012

Lab # 1(A-G)/Sample ID : MC-2

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.04	mg/l	0.01	10-10/1600	10-10/1615	4500-PE	*ECL-R
Phosphorus	0.09	mg/l	0.01	10-11/1445	10-12/1500	4500-PE	*ECL-R
TKN	0.6	mg/l	0.1	10-11/0900	10-12/0930	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	10-12/1115	10-12/1305	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	10-12/1100	10-12/1145	2540 F	*ECL-R
E. Coli	1700	CFU/100ml	1	10-10/1607	10-11/1446	1603	*ECL-R
Enterococci	980	CFU/100ml	1	10-10/1607	10-11/1446	1600	*ECL-R
TSS	5.7	mg/l	1.0	10-12/1530	10-16/1300	2540 D	SDM
Nitrate+Nitrite	BQL	mg/l	0.1	10-12/1015	10-12/1630	4500NO3E	SDM
TOC	3.6	mg/l	1.0	10-11/1045	10-11/1440	5310	SDM
Total Nitrogen	0.6	mg/l	0.1	10-23/0950	10-23/0950	calc.	AEM
Chlorophyll a	0.06	mg/m3	0.01	10-11/1545	10-16/1545	10200H	*ECL-R

Lab # 2(A-G)/Sample ID : MC-3

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.05	mg/l	0.01	10-10/1600	10-10/1615	4500-PE	*ECL-R
Phosphorus	0.11	mg/l	0.01	10-11/1445	10-12/1500	4500-PE	*ECL-R
TKN	0.6	mg/l	0.1	10-11/0900	10-12/0930	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	10-12/1115	10-12/1305	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	10-12/1100	10-12/1145	2540 F	*ECL-R
E. Coli	1500	CFU/100ml	1	10-10/1607	10-11/1446	1603	*ECL-R
Enterococci	1000	CFU/100ml	1	10-10/1607	10-11/1446	1600	*ECL-R
TSS	5.7	mg/l	1.0	10-12/1530	10-16/1300	2540 D	SDM
Nitrate+Nitrite	0.1	mg/l	0.1	10-12/1015	10-12/1630	4500NO3E	SDM
TOC	7.9	mg/l	1.0	10-11/1045	10-11/1440	5310	SDM
Total Nitrogen	0.7	mg/l	0.1	10-23/0950	10-23/0950	calc.	AEM
Chlorophyll a	0.35	mg/m3	0.01	10-11/1545	10-16/1545	10200H	*ECL-R

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.





## Analytical Summary

Enviro Compliance Laboratories, Inc.  
816 Kiwanis Street  
Hampton, Virginia 23661  
(757) 244-3424  
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www.envirocompliance.com  
ec1hampton@envirocompliance.com

City of Norfolk  
Attn: Rey Hernandez  
2233 McKann Avenue  
Norfolk, Virginia 23509

Project Name : Mason Creek WQ Study  
Date Received: October 10, 2012  
Date Sampled : October 10, 2012  
Time Sampled : 11:40  
Date Issued : October 23, 2012

Lab # 3(A-G)/Sample ID : MC-4

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.07	mg/l	0.01	10-10/1600	10-10/1615	4500-PE	*ECL-R
Phosphorus	0.12	mg/l	0.01	10-11/1445	10-12/1500	4500-PE	*ECL-R
TKN	0.5	mg/l	0.1	10-11/0900	10-12/0930	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	10-12/1115	10-12/1305	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	10-12/1100	10-12/1145	2540 F	*ECL-R
E. Coli	1500	CFU/100ml	1	10-10/1607	10-11/1446	1603	*ECL-R
Enterococci	1300	CFU/100ml	1	10-10/1607	10-11/1446	1600	*ECL-R
TSS	7.1	mg/l	1.0	10-12/1530	10-16/1300	2540 D	SDM
Nitrate+Nitrite	0.1	mg/l	0.1	10-12/1015	10-12/1630	4500NO3E	SDM
TOC	5.7	mg/l	1.0	10-11/1045	10-11/1440	5310	SDM
Total Nitrogen	0.6	mg/l	0.1	10-23/0950	10-23/0950	calc.	AEM
Chlorophyll a	0.10	mg/m3	0.01	10-11/1545	10-16/1545	10200H	*ECL-R

Lab # 4(A-G)/Sample ID : MC-5

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.16	mg/l	0.01	10-10/1600	10-10/1615	4500-PE	*ECL-R
Phosphorus	0.21	mg/l	0.01	10-11/1445	10-12/1500	4500-PE	*ECL-R
TKN	0.5	mg/l	0.1	10-11/0900	10-12/0930	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	10-12/1115	10-12/1305	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	10-12/1100	10-12/1145	2540 F	*ECL-R
E. Coli	290	CFU/100ml	1	10-10/1607	10-11/1446	1603	*ECL-R
Enterococci	1500	CFU/100ml	1	10-10/1607	10-11/1446	1600	*ECL-R
TSS	4.2	mg/l	1.0	10-12/1530	10-16/1300	2540 D	SDM
Nitrate+Nitrite	0.2	mg/l	0.1	10-12/1015	10-12/1630	4500NO3E	SDM
TOC	4.4	mg/l	1.0	10-11/1045	10-11/1440	5310	SDM
Total Nitrogen	0.7	mg/l	0.1	10-23/0950	10-23/0950	calc.	AEM
Chlorophyll a	BQL	mg/m3	0.01	10-11/1545	10-16/1545	10200H	*ECL-R

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.





## Analytical Summary

Enviro Compliance Laboratories, Inc.  
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City of Norfolk  
Attn: Rey Hernandez  
2233 McKann Avenue  
Norfolk, Virginia 23509

Project Name : Mason Creek WQ Study  
Date Received: October 10, 2012  
Date Sampled : October 10, 2012  
Time Sampled : 13:10  
Date Issued : October 23, 2012

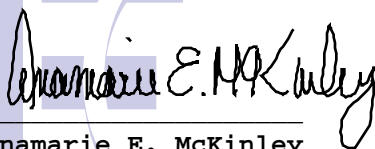
Lab # 5(A-G)/Sample ID : MC-1

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.06	mg/l	0.01	10-10/1600	10-10/1615	4500-PE	*ECL-R
Phosphorus	0.09	mg/l	0.01	10-11/1445	10-12/1500	4500-PE	*ECL-R
TKN	0.7	mg/l	0.1	10-11/0900	10-12/0930	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	10-12/1115	10-12/1305	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	10-12/1100	10-12/1145	2540 F	*ECL-R
E. Coli	< 1	CFU/100ml	1	10-10/1607	10-11/1446	1603	*ECL-R
Enterococci	560	CFU/100ml	1	10-10/1607	10-11/1446	1600	*ECL-R
TSS	5.5	mg/l	1.0	10-12/1530	10-16/1300	2540 D	SDM
Nitrate+Nitrite	0.1	mg/l	0.1	10-12/1015	10-12/1630	4500NO3E	SDM
TOC	4.0	mg/l	1.0	10-11/1045	10-11/1440	5310	SDM
Total Nitrogen	0.8	mg/l	0.1	10-23/0950	10-23/0950	calc.	AEM
Chlorophyll a	0.26	mg/m3	0.01	10-11/1545	10-16/1545	10200H	*ECL-R

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.

  
Anamarie E. McKinley  
Laboratory Manager

Report #: H2A28557 Page 3 of 4



VELAP ID#: 460130





## Report Annex

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### Abbreviations:

NR = Not Reported

ND = Not Detected

BQL = Below Quantitation Level (Result is less than stated QL)

< = Result is less than Quantitation Limit

### Quality Assurance Flags:

L = LCS did not meet method criteria.

H/B = Blank did not meet QC criteria

HT = Sample was not analyzed within holding times.

SR = Surrogate Recovery not available due to dilution.

R = Corr Coef <.995

C = Initial Instrument Calibration (Second Source) did not meet criteria

V = Continuing Calibration Verification did not meet criteria

S = Matrix Spike did not meet criteria

D = Duplicate did not meet criteria

OVR = Overrange- Sample was outside of calibration range

UnR = Underrange w/Diln.- Sample was below low standard because of dilution

TOX = Toxicity exhibited in BOD

G = GGA/Int. QC was not 198.5+/-30.5

Y = Yield not within 10-200mg

\* = Analysis was subcontracted

\*\* = Non-accreditable/non-accredited parameter

### Subcontractor Information:

Information for subcontracted analytical data.

ECL-R=EnviroCompliance Laboratories :

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ECL-R=EnviroCompliance Laboratories :

ECL-R=EnviroCompliance Laboratories :

Analysis was performed in accordance to NELAC requirements unless otherwise noted.

All methods are 40 CFR 136 March 12, 2007, Table IB approved.

Reference to Standard Methods is 18th ed.





## Analytical Summary

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www.envirocompliance.com  
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City of Norfolk  
Attn: Ray Hernandez  
2233 McKann Avenue  
Norfolk, Virginia 23509

Project Name : Mason Creek  
Date Received: October 31, 2012  
Date Sampled : October 31, 2012  
Time Sampled : 10:19  
Date Issued : November 19, 2012

Lab # 1(A-G)/Sample ID : MC-1

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.14	mg/l	0.01	11-01/1300	11-01/1320	4500-PE	*ECL-R
Phosphorus	0.17	mg/l	0.01	11-02/1500	11-05/1345	4500-PE	*ECL-R
TKN	1.9	mg/l	0.1	11-02/0900	11-05/1020	4500NH3F	*ECL-R
Ammonia (as N)	0.1	mg/l	0.1	11-02/1100	11-02/1120	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.4	11-02/0930	11-02/1030	2540 F	*ECL-R
E. Coli	5600	CFU/100ml	1	10-31/1624	11-01/1510	1603	SKL
Enterococci	6500	CFU/100ml	1	10-31/1624	11-01/1515	1600	SKL
TSS	4.7	mg/l	1.0	11-01/1240	11-06/1600	2540 D	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	11-08/1330	11-08/1545	4500NO3E	SDM
Total Nitrogen	1.9	mg/l	0.1	11-19/0835	11-19/0835	calc.	*ECL-R
Chlorophyll a	BQL	mg/m3	0.01	11-01/1020	11-06/1020	10200H	SKL
TOC	BQL	mg/l	10.0	11-01/1300	11-01/1620	5310	SDM

Lab # 2(A-G)/Sample ID : MC-2

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.06	mg/l	0.01	11-01/1300	11-01/1320	4500-PE	*ECL-R
Phosphorus	0.11	mg/l	0.01	11-02/1500	11-05/1345	4500-PE	*ECL-R
TKN	1.1	mg/l	0.1	11-02/0900	11-05/1020	4500NH3F	*ECL-R
Ammonia (as N)	0.1	mg/l	0.1	11-02/1100	11-02/1120	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.4	11-02/0930	11-02/1030	2540 F	*ECL-R
E. Coli	2300	CFU/100ml	1	10-31/1624	11-01/1510	1603	SKL
Enterococci	5600	CFU/100ml	1	10-31/1624	11-01/1515	1600	SKL
TSS	3.9	mg/l	1.0	11-01/1240	11-06/1600	2540 D	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	11-08/1330	11-08/1545	4500NO3E	SDM
Total Nitrogen	1.1	mg/l	0.1	11-19/0835	11-19/0835	calc.	*ECL-R
Chlorophyll a	BQL	mg/m3	0.01	11-01/1020	11-06/1020	10200H	SKL
TOC	BQL	mg/l	10.0	11-01/1300	11-01/1620	5310	SDM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.





## Analytical Summary

Enviro Compliance Laboratories, Inc.  
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ec1hampton@envirocompliance.com

City of Norfolk  
Attn: Ray Hernandez  
2233 McKann Avenue  
Norfolk, Virginia 23509

Project Name : Mason Creek  
Date Received: October 31, 2012  
Date Sampled : October 31, 2012  
Time Sampled : 10:50  
Date Issued : November 19, 2012

Lab # 3(A-G)/Sample ID : MC-3

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.11	mg/l	0.01	11-01/1300	11-01/1320	4500-PE	*ECL-R
Phosphorus	0.15	mg/l	0.01	11-02/1500	11-05/1345	4500-PE	*ECL-R
TKN	1.3	mg/l	0.1	11-02/0900	11-05/1020	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	11-02/1100	11-02/1120	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.4	11-02/0930	11-02/1030	2540 F	*ECL-R
E. Coli	2000	CFU/100ml	1	10-31/1624	11-01/1510	1603	SKL
Enterococci	5400	CFU/100ml	1	10-31/1624	11-01/1515	1600	SKL
TSS	2.9	mg/l	1.0	11-01/1240	11-06/1600	2540 D	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	11-08/1330	11-08/1545	4500NO3E	SDM
Total Nitrogen	1.3	mg/l	0.1	11-19/0835	11-19/0835	calc.	*ECL-R
Chlorophyll a	BQL	mg/m3	0.01	11-01/1020	11-06/1020	10200H	SKL
TOC	BQL	mg/l	10.0	11-01/1300	11-01/1620	5310	SDM

Lab # 4(A-G)/Sample ID : MC-4

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.11	mg/l	0.01	11-01/1300	11-01/1320	4500-PE	*ECL-R
Phosphorus	0.16	mg/l	0.01	11-02/1500	11-05/1345	4500-PE	*ECL-R
TKN	1.4	mg/l	0.1	11-02/0900	11-05/1020	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	11-02/1100	11-02/1120	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.4	11-02/0930	11-02/1030	2540 F	*ECL-R
E. Coli	2700	CFU/100ml	1	10-31/1624	11-01/1510	1603	SKL
Enterococci	5200	CFU/100ml	1	10-31/1624	11-01/1515	1600	SKL
TSS	3.4	mg/l	1.0	11-01/1240	11-06/1600	2540 D	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	11-08/1330	11-08/1545	4500NO3E	SDM
Total Nitrogen	1.4	mg/l	0.1	11-19/0835	11-19/0835	calc.	*ECL-R
Chlorophyll a	BQL	mg/m3	0.01	11-01/1020	11-06/1020	10200H	SKL
TOC	BQL	mg/l	10.0	11-01/1300	11-01/1620	5310	SDM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.







## Analytical Summary

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City of Norfolk  
Attn: Ray Hernandez  
2233 McKann Avenue  
Norfolk, Virginia 23509

Project Name : Mason Creek  
Date Received: October 31, 2012  
Date Sampled : October 31, 2012  
Time Sampled : 11:30  
Date Issued : November 19, 2012

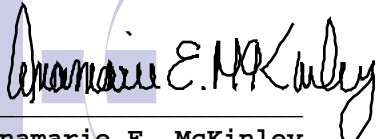
Lab # 5(A-G)/Sample ID : MC-5

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	BQL	mg/l	0.01	11-01/1300	11-01/1320	4500-PE	*ECL-R
Phosphorus	0.21	mg/l	0.01	11-02/1500	11-05/1345	4500-PE	*ECL-R
TKN	1.3	mg/l	0.1	11-02/0900	11-05/1020	4500NH3F	*ECL-R
Ammonia (as N)	0.1	mg/l	0.1	11-02/1100	11-02/1120	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.4	11-02/0930	11-02/1030	2540 F	*ECL-R
E. Coli	3000	CFU/100ml	1	10-31/1624	11-01/1510	1603	SKL
Enterococci	6200	CFU/100ml	1	10-31/1624	11-01/1515	1600	SKL
TSS	4.1	mg/l	1.0	11-01/1240	11-06/1600	2540 D	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	11-08/1330	11-08/1545	4500NO3E	SDM
Total Nitrogen	1.3	mg/l	0.1	11-19/0835	11-19/0835	calc.	*ECL-R
Chlorophyll a	BQL	mg/m3	0.01	11-01/1020	11-06/1020	10200H	SKL
TOC	BQL	mg/l	10.0	11-01/1300	11-01/1620	5310	SDM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.

  
Anamarie E. McKinley  
Laboratory Manager

Report #: H2A28651 Page 3 of 4



VELAP ID#: 460130





## Report Annex

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### Abbreviations:

NR = Not Reported

ND = Not Detected

BQL = Below Quantitation Level (Result is less than stated QL)

< = Result is less than Quantitation Limit

### Quality Assurance Flags:

L = LCS did not meet method criteria.

H/B = Blank did not meet QC criteria

HT = Sample was not analyzed within holding times.

SR = Surrogate Recovery not available due to dilution.

R = Corr Coef <.995

C = Initial Instrument Calibration (Second Source) did not meet criteria

V = Continuing Calibration Verification did not meet criteria

S = Matrix Spike did not meet criteria

D = Duplicate did not meet criteria

OVR = Overrange- Sample was outside of calibration range

UnR = Underrange w/Diln.- Sample was below low standard because of dilution

TOX = Toxicity exhibited in BOD

G = GGA/Int. QC was not 198.5+/-30.5

Y = Yield not within 10-200mg

\* = Analysis was subcontracted

\*\* = Non-accreditable/non-accredited parameter

### Subcontractor Information:

Information for subcontracted analytical data.

ECL-R=EnviroCompliance Laboratories :460032

ECL-R=EnviroCompliance Laboratories :460032

ECL-R=EnviroCompliance Laboratories :460032

ECL-R=EnviroCompliance Laboratories :460032

### Notes:

Analysis was performed in accordance to NELAC requirements unless otherwise noted.

All methods are 40 CFR 136 March 12, 2007, Table IB approved.

Reference to Standard Methods is 18th ed.





## Analytical Summary

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City of Norfolk  
Attn: Rey Hernandez  
2233 McKann Avenue  
Norfolk, Virginia 23509

Project Name : Mason Creek WQ Study  
Date Received: November 26, 2012  
Date Sampled : November 26, 2012  
Time Sampled : 10:30  
Date Issued : December 12, 2012

Lab # 1(A-G)/Sample ID : MC-1

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.02	mg/l	0.01	11-27/1515	11-27/1545	4500-PE	*ECL-R
Phosphorus	0.07	mg/l	0.01	11-29/1300	11-30/1515	4500-PE	*ECL-R
TKN	2.3	mg/l	0.1	11-28/1630	11-29/0930	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	11-30/1145	11-30/1300	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	11-29/1000	11-29/1000	2540 F	*ECL-R
E. Coli	25	CFU/100ml	1	11-26/1655	11-27/1504	1603	*ECL-R
Enterococci	87	CFU/100ml	1	11-26/1655	11-27/1500	1600	*ECL-R
TSS	7.2	mg/l	1.0	11-27/0645	11-29/1745	2540 D	SDM
Nitrate+Nitrite	BQL	mg/l	1.0	12-10/0845	12-10/1630	4500NO3E	SDM
TOC	BQL	mg/l	10.0	11-27/1700	11-27/1825	5310	SDM
Total Nitrogen	2.3	mg/l	0.1	12-12/1016	12-12/1016	calc.	AEM
Chlorophyll a	0.40	mg/m3	0.01	11-27/1045	12-03/1338	10200H	SKL

Lab # 2(A-G)/Sample ID : MC-2

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.01	mg/l	0.01	11-27/1515	11-27/1545	4500-PE	*ECL-R
Phosphorus	0.04	mg/l	0.01	11-30/1515	11-30/1515	4500-PE	*ECL-R
TKN	2.7	mg/l	0.1	11-28/1630	11-29/0930	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	11-30/1145	11-30/1300	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	11-29/1000	11-29/1000	2540 F	*ECL-R
E. Coli	25	CFU/100ml	1	11-26/1655	11-27/1504	1603	*ECL-R
Enterococci	89	CFU/100ml	1	11-26/1655	11-27/1500	1600	*ECL-R
TSS	7.5	mg/l	1.0	11-27/0645	11-29/1745	2540 D	SDM
Nitrate+Nitrite	BQL	mg/l	0.1	12-10/0845	12-10/1630	4500NO3E	SDM
TOC	BQL	mg/l	10.0	11-27/1700	11-27/1825	5310	SDM
Total Nitrogen	2.7	mg/l	0.1	12-12/1016	12-12/1016	calc.	AEM
Chlorophyll a	0.48	mg/m3	0.01	11-27/1045	12-03/1338	10200H	SKL

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.





## Analytical Summary

Enviro Compliance Laboratories, Inc.  
816 Kiwanis Street  
Hampton, Virginia 23661  
(757) 244-3424  
Fax: (757) 244-3243  
www.envirocompliance.com  
ec1hampton@envirocompliance.com

City of Norfolk  
Attn: Rey Hernandez  
2233 McKann Avenue  
Norfolk, Virginia 23509

Project Name : Mason Creek WQ Study  
Date Received: November 26, 2012  
Date Sampled : November 26, 2012  
Time Sampled : 11:30  
Date Issued : December 12, 2012

Lab # 3(A-G)/Sample ID : MC-3

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.01	mg/l	0.01	11-27/1515	11-27/1545	4500-PE	*ECL-R
Phosphorus	0.05	mg/l	0.01	11-30/1515	11-30/1515	4500-PE	*ECL-R
TKN	3.6	mg/l	0.1	11-28/1630	11-29/0930	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	11-30/1145	11-30/1300	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	11-29/1000	11-29/1000	2540 F	*ECL-R
E. Coli	23	CFU/100ml	1	11-26/1655	11-27/1504	1603	*ECL-R
Enterococci	120	CFU/100ml	1	11-26/1655	11-27/1500	1600	*ECL-R
TSS	6.0	mg/l	1.0	11-27/0645	11-29/1745	2540 D	SDM
Nitrate+Nitrite	BQL	mg/l	1.0	12-10/0845	12-10/1630	4500NO3E	SDM
TOC	BQL	mg/l	10.0	11-27/1700	11-27/1825	5310	SDM
Total Nitrogen	3.6	mg/l	0.1	12-12/1016	12-12/1016	calc.	AEM
Chlorophyll a	0.43	mg/m3	0.01	11-27/1045	12-03/1338	10200H	SKL

Lab # 4(A)/Sample ID : MC-4

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.01	mg/l	0.01	11-27/1515	11-27/1545	4500-PE	*ECL-R
Phosphorus	0.05	mg/l	0.01	11-30/1515	11-30/1515	4500-PE	*ECL-R
TKN	1.3	mg/l	0.1	11-28/1630	11-29/0930	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	11-30/1145	11-30/1300	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	11-29/1000	11-29/1000	2540 F	*ECL-R
E. Coli	12	CFU/100ml	1	11-26/1655	11-27/1504	1603	*ECL-R
Enterococci	63	CFU/100ml	1	11-26/1655	11-27/1500	1600	*ECL-R
TSS	5.0	mg/l	1.0	11-27/0645	11-29/1745	2540 D	SDM
Nitrate+Nitrite	BQL	mg/l	0.1	12-10/0845	12-10/1630	4500NO3E	SDM
TOC	BQL	mg/l	10.0	11-27/1700	11-27/1825	5310	SDM
Total Nitrogen	1.3	mg/l	0.1	12-12/1016	12-12/1016	calc.	AEM
Chlorophyll a	0.50	mg/m3	0.01	11-27/1045	12-03/1338	10200H	SKL

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

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City of Norfolk  
Attn: Rey Hernandez  
2233 McKann Avenue  
Norfolk, Virginia 23509

Project Name : Mason Creek WQ Study  
Date Received: November 26, 2012  
Date Sampled : November 26, 2012  
Time Sampled : 12:00  
Date Issued : December 12, 2012

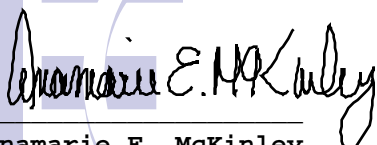
Lab # 5(A-G)/Sample ID : MC-5

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.06	mg/l	0.01	11-27/1515	11-27/1545	4500-PE	*ECL-R
Phosphorus	0.11	mg/l	0.01	11-30/1515	11-30/1515	4500-PE	*ECL-R
TKN	2.7	mg/l	0.1	11-28/1630	11-29/0930	4500NH3F	*ECL-R
Ammonia (as N)	0.2	mg/l	0.1	11-30/1145	11-30/1300	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	11-29/1000	11-29/1000	2540 F	*ECL-R
E. Coli	100	CFU/100ml	1	11-26/1655	11-27/1504	1603	*ECL-R
Enterococci	120	CFU/100ml	1	11-26/1655	11-27/1500	1600	*ECL-R
TSS	4.4	mg/l	1.0	11-27/0645	11-29/1745	2540 D	SDM
Nitrate+Nitrite	BQL	mg/l	1.0	12-10/0845	12-10/1630	4500NO3E	SDM
TOC	BQL	mg/l	10.0	11-27/1700	11-27/1825	5310	SDM
Total Nitrogen	2.7	mg/l	0.1	12-12/1016	12-12/1016	calc.	AEM
Chlorophyll a	0.36	mg/m3	0.01	11-27/1045	12-03/1338	10200H	SKL

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.

  
Anamarie E. McKinley  
Laboratory Manager

Report #: H2B28766 Page 3 of 4



VELAP ID#: 460130





## Report Annex

Enviro Compliance Laboratories, Inc.  
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### Abbreviations:

NR = Not Reported

ND = Not Detected

BQL = Below Quantitation Level (Result is less than stated QL)

< = Result is less than Quantitation Limit

### Quality Assurance Flags:

L = LCS did not meet method criteria.

H/B = Blank did not meet QC criteria

HT = Sample was not analyzed within holding times.

SR = Surrogate Recovery not available due to dilution.

R = Corr Coef <.995

C = Initial Instrument Calibration (Second Source) did not meet criteria

V = Continuing Calibration Verification did not meet criteria

S = Matrix Spike did not meet criteria

D = Duplicate did not meet criteria

OVR = Overrange- Sample was outside of calibration range

UnR = Underrange w/Diln.- Sample was below low standard because of dilution

TOX = Toxicity exhibited in BOD

G = GGA/Int. QC was not 198.5+/-30.5

Y = Yield not within 10-200mg

\* = Analysis was subcontracted

\*\* = Non-accreditable/non-accredited parameter

### Subcontractor Information:

Information for subcontracted analytical data.

ECL-R=EnviroCompliance Laboratories :460032

ECL-R=EnviroCompliance Laboratories :460032

ECL-R=EnviroCompliance Laboratories :460032

ECL-R=EnviroCompliance Laboratories :460032

### Notes:

Analysis was performed in accordance to NELAC requirements unless otherwise noted.

All methods are 40 CFR 136 March 12, 2007, Table IB approved.

Reference to Standard Methods is 18th ed.





## Analytical Summary

Enviro Compliance Laboratories, Inc.  
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(757) 244-3424  
Fax: (757) 244-3243  
www.envirocompliance.com  
echampton@envirocompliance.com

City of Norfolk  
Attn: Ray Hernandez  
2233 McKann Avenue  
Norfolk, Virginia 23509

Project Name : Mason Creek  
Date Received: January 07, 2013  
Date Sampled : January 07, 2013  
Time Sampled : 09:50  
Date Issued : January 28, 2013

Lab # 1(A-G)/Sample ID : MC-1

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.03	mg/l	0.01	01-07/1515	01-07/1545	4500-PE	*ECL-R
Phosphorus	0.06	mg/l	0.01	01-09/1500	01-10/1345	4500-P E	*ECL-R
TKN	1.5	mg/l	0.1	01-08/0930	01-08/0945	4500NH3F	*ECL-R
Ammonia (as N)	0.5	mg/l	0.1	01-08/1000	01-08/1100	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	01-07/1100	01-08/1100	2540 F	*ECL-R
E. Coli	79	CFU/100ml	1	01-07/1515	01-08/1410	1603	ECL
Enterococci	220	CFU/100ml	1	01-07/1515	01-08/1410	1600	ECL
TSS	21.2	mg/l	1.0	01-10/1300	01-15/1130	2540 D	SDM
Total Nitrogen	1.5	mg/l	0.1	01-28/1556	01-28/1556	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	01-08/1315	01-08/1630	4500NO3E	*ECL-R
Chlorophyll a	0.16	mg/m3	0.01	01-07/1500	01-15/0900	10200H	ECL
TOC	BQL	mg/l	10.0	01-08/1000	01-08/1300	5310	SDM

Lab # 2(A-G)/Sample ID : MC-2

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	BQL	mg/l	0.01	01-07/1515	01-07/1545	4500-PE	*ECL-R
Phosphorus	0.02	mg/l	0.01	01-09/1500	01-10/1345	4500-P E	*ECL-R
TKN	0.8	mg/l	0.1	01-08/0930	01-08/0945	4500NH3F	*ECL-R
Ammonia (as N)	0.1	mg/l	0.1	01-08/1000	01-08/1100	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	01-07/1100	01-08/1100	2540 F	*ECL-R
E. Coli	4	CFU/100ml	1	01-07/1515	01-08/1410	1603	ECL
Enterococci	24	CFU/100ml	1	01-07/1515	01-08/1410	1600	ECL
TSS	2.5	mg/l	1.0	01-10/1300	01-15/1130	2540 D	SDM
Total Nitrogen	0.8	mg/l	0.1	01-28/1556	01-28/1556	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	0.1	01-08/1315	01-08/1630	4500NO3E	*ECL-R
Chlorophyll a	0.13	mg/m3	0.01	01-07/1500	01-15/0900	10200H	ECL
TOC	BQL	mg/l	10.0	01-08/1000	01-08/1300	5310	SDM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.





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City of Norfolk  
Attn: Ray Hernandez  
2233 McKann Avenue  
Norfolk, Virginia 23509

Project Name : Mason Creek  
Date Received: January 07, 2013  
Date Sampled : January 07, 2013  
Time Sampled : 10:30  
Date Issued : January 28, 2013

Lab # 3(A-G)/Sample ID : MC-3

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	BQL	mg/l	0.01	01-07/1515	01-07/1545	4500-PE	*ECL-R
Phosphorus	0.03	mg/l	0.01	01-09/1500	01-10/1345	4500-P E	*ECL-R
TKN	1.6	mg/l	0.1	01-08/0930	01-08/0945	4500NH3F	*ECL-R
Ammonia (as N)	0.4	mg/l	0.1	01-08/1000	01-08/1100	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	01-07/1100	01-08/1100	2540 F	*ECL-R
E. Coli	< 1	CFU/100ml	1	01-07/1515	01-08/1410	1603	ECL
Enterococci	22	CFU/100ml	1	01-07/1515	01-08/1410	1600	ECL
TSS	3.8	mg/l	1.0	01-10/1300	01-15/1130	2540 D	SDM
Total Nitrogen	1.6	mg/l	0.1	01-28/1556	01-28/1556	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	0.1	01-08/1315	01-08/1630	4500NO3E	*ECL-R
Chlorophyll a	0.08	mg/m3	0.01	01-07/1500	01-15/0900	10200H	ECL
TOC	BQL	mg/l	10.0	01-08/1000	01-08/1300	5310	SDM

Lab # 4(A-G)/Sample ID : MC-4

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.04	mg/l	0.01	01-07/1515	01-07/1545	4500-PE	*ECL-R
Phosphorus	0.06	mg/l	0.01	01-09/1500	01-10/1345	4500-P E	*ECL-R
TKN	3.2	mg/l	0.1	01-08/0930	01-08/0945	4500NH3F	*ECL-R
Ammonia (as N)	1.0	mg/l	0.1	01-08/1000	01-08/1100	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	01-07/1100	01-08/1100	2540 F	*ECL-R
E. Coli	8	CFU/100ml	1	01-07/1515	01-08/1410	1603	ECL
Enterococci	34	CFU/100ml	1	01-07/1515	01-08/1410	1600	ECL
TSS	4.2	mg/l	1.0	01-10/1300	01-15/1130	2540 D	SDM
Total Nitrogen	3.2	mg/l	0.1	01-28/1556	01-28/1556	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	01-08/1315	01-08/1630	4500NO3E	*ECL-R
Chlorophyll a	0.05	mg/m3	0.01	01-07/1500	01-15/0900	10200H	ECL
TOC	10.3	mg/l	10.0	01-08/1000	01-08/1300	5310	SDM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

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City of Norfolk  
Attn: Ray Hernandez  
2233 McKann Avenue  
Norfolk, Virginia 23509

Project Name : Mason Creek  
Date Received: January 07, 2013  
Date Sampled : January 07, 2013  
Time Sampled : 11:05  
Date Issued : January 28, 2013

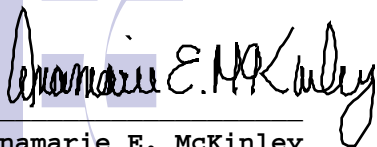
Lab # 5(A-G)/Sample ID : MC-5

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.08	mg/l	0.01	01-07/1515	01-07/1545	4500-PE	*ECL-R
Phosphorus	0.12	mg/l	0.01	01-09/1500	01-10/1345	4500-P E	*ECL-R
TKN	3.0	mg/l	0.1	01-08/0930	01-08/0945	4500NH3F	*ECL-R
Ammonia (as N)	1.8	mg/l	0.1	01-08/1000	01-08/1100	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	<01-07/1100	01-08/1100	2540 F	*ECL-R
E. Coli	69	CFU/100ml	1	01-07/1515	01-08/1410	1603	ECL
Enterococci	100	CFU/100ml	1	01-07/1515	01-08/1410	1600	ECL
TSS	11.2	mg/l	1.0	01-10/1300	01-15/1130	2540 D	SDM
Total Nitrogen	3.0	mg/l	0.1	01-28/1556	01-28/1556	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	01-08/1315	01-08/1630	4500NO3E	*ECL-R
Chlorophyll a	0.21	mg/m3	0.01	01-07/1500	01-15/0900	10200H	ECL
TOC	BQL	mg/l	10.0	01-08/1000	01-08/1300	5310	SDM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.

  
Anamarie E. McKinley  
Laboratory Manager

Report #: H3129010 Page 3 of 4



VELAP ID#: 460130



## Report Annex

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### Abbreviations:

NR = Not Reported

ND = Not Detected

BQL = Below Quantitation Level (Result is less than stated QL)

< = Result is less than Quantitation Limit

### Quality Assurance Flags:

L = LCS did not meet method criteria.

H/B = Blank did not meet QC criteria

HT = Sample was not analyzed within holding times.

SR = Surrogate Recovery not available due to dilution.

R = Corr Coef <.995

C = Initial Instrument Calibration (Second Source) did not meet criteria

V = Continuing Calibration Verification did not meet criteria

S = Matrix Spike did not meet criteria

D = Duplicate did not meet criteria

OvR = Overrange- Sample was outside of calibration range

UnR = Underrange w/Diln.- Sample was below low standard because of dilution

TOX = Toxicity exhibited in BOD

G = GGA/Int. QC was not 198.5+/-30.5

Y = Yield not within 10-200mg

\* = Analysis was subcontracted

\*\* = Non-accreditable/non-accredited parameter

### Subcontractor Information:

Information for subcontracted analytical data.

ECL-R=EnviroCompliance Laboratories :460032

ECL-R=EnviroCompliance Laboratories :460032

ECL-R=EnviroCompliance Laboratories :460032

ECL-R=EnviroCompliance Laboratories :460032

### Notes:

Analysis was performed in accordance to NELAC requirements unless otherwise noted.

All methods are 40 CFR 136 March 12, 2007, Table IB approved.

Reference to Standard Methods is 18th ed.





## Analytical Summary

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City of Norfolk  
Attn: Rey Hernandez  
2233 McKann Avenue  
Norfolk, Virginia 23509

Project Name : Mason Creek - WQ Study  
Date Received: March 01, 2013  
Date Sampled : March 01, 2013  
Time Sampled : 09:15  
Date Issued : March 27, 2013

Lab # 1(A)/Sample ID : MC-1

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.05	mg/l	0.01	03-01/1530	03-01/1550	4500-PE	*ECL-R
Phosphorus	0.09	mg/l	0.01	03-05/1230	03-05/1515	4500-PE	*ECL-R
TKN	3.7	mg/l	0.1	03-05/0845	03-06/1000	4500NH3F	*ECL-R
Ammonia (as N)	0.4	mg/l	0.1	03-04/1300	03-04/1400	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	0.1	03-05/0815	03-05/0815	2540 F	*ECL-R
E. Coli	600	CFU/100ml	1	03-01/1530	03-02/1420	1603	*ECL-R
Enterococci	2300	CFU/100ml	1	03-01/1530	03-02/1406	1600	*ECL-R
TSS	4.8	mg/l	1.0	03-06/1100	03-06/1635	2540 D	SDM
Total Nitrogen	3.7	mg/l	0.1	03-27/0915	03-27/0915	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	03-05/1130	03-05/1700	4500NO3E	SDM
Chlorophyll a	0.05	mg/m3	0.01	03-01/1445	03-14/1237	10200H	*ECL-R
TOC	BQL	mg/l	10.0	03-07/0930	03-07/1115	5310	SDM

Lab # 2(A)/Sample ID : MC-2

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.01	mg/l	0.01	03-01/1530	03-01/1550	4500-PE	*ECL-R
Phosphorus	0.04	mg/l	0.01	03-05/1230	03-05/1515	4500-PE	*ECL-R
TKN	3.4	mg/l	0.1	03-05/0845	03-06/1000	4500NH3F	*ECL-R
Ammonia (as N)	0.2	mg/l	0.1	03-04/1300	03-04/1400	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	0.1	03-05/0815	03-05/0815	2540 F	*ECL-R
E. Coli	24	CFU/100ml	1	03-01/1530	03-02/1420	1603	*ECL-R
Enterococci	28	CFU/100ml	1	03-01/1530	03-02/1406	1600	*ECL-R
TSS	9.4	mg/l	1.0	03-06/1100	03-06/1635	2540 D	SDM
Total Nitrogen	3.4	mg/l	0.1	03-27/0915	03-27/0915	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	03-05/1130	03-05/1700	4500NO3E	SDM
Chlorophyll a	0.10	mg/m3	0.01	03-01/1445	03-14/1237	10200H	*ECL-R
TOC	BQL	mg/l	10.0	03-07/0930	03-07/1115	5310	SDM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.





## Analytical Summary

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www.envirocompliance.com  
eclhampton@envirocompliance.com

City of Norfolk  
Attn: Rey Hernandez  
2233 McKann Avenue  
Norfolk, Virginia 23509

Project Name : Mason Creek - WQ Study  
Date Received: March 01, 2013  
Date Sampled : March 01, 2013  
Time Sampled : 09:00  
Date Issued : March 27, 2013

Lab # 3(A)/Sample ID : MC-3

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.01	mg/l	0.01	03-01/1530	03-01/1550	4500-PE	*ECL-R
Phosphorus	0.04	mg/l	0.01	03-05/1230	03-05/1515	4500-PE	*ECL-R
TKN	2.2	mg/l	0.1	03-05/0845	03-06/1000	4500NH3F	*ECL-R
Ammonia (as N)	0.1	mg/l	0.1	03-04/1300	03-04/1400	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	0.1	03-05/0815	03-05/0815	2540 F	*ECL-R
E. Coli	11	CFU/100ml	1	03-01/1530	03-02/1420	1603	*ECL-R
Enterococci	74	CFU/100ml	1	03-01/1530	03-02/1406	1600	*ECL-R
TSS	4.2	mg/l	1.0	03-06/1100	03-06/1635	2540 D	SDM
Total Nitrogen	2.2	mg/l	0.1	03-27/0915	03-27/0915	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	03-05/1130	03-05/1700	4500NO3E	SDM
Chlorophyll a	0.12	mg/m3	0.01	03-01/1445	03-14/1237	10200H	*ECL-R
TOC	BQL	mg/l	10.0	03-07/0930	03-07/1115	5310	SDM

Lab # 4(A)/Sample ID : MC-4

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.01	mg/l	0.01	03-01/1530	03-01/1550	4500-PE	*ECL-R
Phosphorus	0.04	mg/l	0.01	03-05/1230	03-05/1515	4500-PE	*ECL-R
TKN	2.0	mg/l	0.1	03-05/0845	03-06/1000	4500NH3F	*ECL-R
Ammonia (as N)	0.1	mg/l	0.1	03-04/1300	03-04/1400	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	0.1	03-05/0815	03-05/0815	2540 F	*ECL-R
E. Coli	20	CFU/100ml	1	03-01/1530	03-02/1420	1603	*ECL-R
Enterococci	24	CFU/100ml	1	03-01/1530	03-02/1406	1600	*ECL-R
TSS	4.0	mg/l	1.0	03-06/1100	03-06/1635	2540 D	SDM
Total Nitrogen	2.0	mg/l	0.1	03-27/0915	03-27/0915	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	03-05/1130	03-05/1700	4500NO3E	SDM
Chlorophyll a	0.17	mg/m3	0.01	03-01/1445	03-14/1237	10200H	*ECL-R
TOC	BQL	mg/l	10.0	03-07/0930	03-07/1115	5310	SDM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.





## Analytical Summary

Enviro Compliance Laboratories, Inc.  
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(757) 244-3424  
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www.envirocompliance.com  
ec1hampton@envirocompliance.com

City of Norfolk  
Attn: Rey Hernandez  
2233 McKann Avenue  
Norfolk, Virginia 23509

Project Name : Mason Creek - WQ Study  
Date Received: March 01, 2013  
Date Sampled : March 01, 2013  
Time Sampled : 10:27  
Date Issued : March 27, 2013

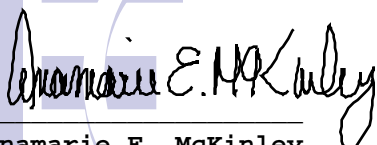
Lab # 5(A)/Sample ID : MC-5

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.04	mg/l	0.01	03-01/1530	03-01/1550	4500-PE	*ECL-R
Phosphorus	0.06	mg/l	0.01	03-05/1230	03-05/1515	4500-PE	*ECL-R
TKN	2.1	mg/l	0.1	03-05/0845	03-06/1000	4500NH3F	*ECL-R
Ammonia (as N)	0.3	mg/l	0.1	03-04/1300	03-04/1400	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	0.1	03-05/0815	03-05/0815	2540 F	*ECL-R
E. Coli	73	CFU/100ml	1	03-01/1530	03-02/1420	1603	*ECL-R
Enterococci	480	CFU/100ml	1	03-01/1530	03-02/1406	1600	*ECL-R
TSS	3.7	mg/l	1.0	03-06/1100	03-06/1635	2540 D	SDM
Total Nitrogen	2.1	mg/l	0.1	03-27/0915	03-27/0915	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	03-05/1130	03-05/1700	4500NO3E	SDM
Chlorophyll a	0.05	mg/m3	0.01	03-01/1445	03-14/1237	10200H	*ECL-R
TOC	BQL	mg/l	10.0	03-07/0930	03-07/1115	5310	SDM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.

  
Anamarie E. McKinley  
Laboratory Manager

Report #: H3329278 Page 3 of 4



VELAP ID#: 460130





## Report Annex

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eclhampton@envirocompliance.com

### Abbreviations:

NR = Not Reported

ND = Not Detected

BQL = Below Quantitation Level (Result is less than stated QL)

< = Result is less than Quantitation Limit

### Quality Assurance Flags:

L = LCS did not meet method criteria.

H/B = Blank did not meet QC criteria

HT = Sample was not analyzed within holding times.

SR = Surrogate Recovery not available due to dilution.

R = Corr Coef <.995

C = Initial Instrument Calibration (Second Source) did not meet criteria

V = Continuing Calibration Verification did not meet criteria

S = Matrix Spike did not meet criteria

D = Duplicate did not meet criteria

OVR = Overrange- Sample was outside of calibration range

UnR = Underrange w/Diln.- Sample was below low standard because of dilution

TOX = Toxicity exhibited in BOD

G = GGA/Int. QC was not 198.5+/-30.5

Y = Yield not within 10-200mg

\* = Analysis was subcontracted

\*\* = Non-accreditable/non-accredited parameter

### Subcontractor Information:

Information for subcontracted analytical data.

ECL-R=EnviroCompliance Laboratories :460032

ECL-R=EnviroCompliance Laboratories :460032

ECL-R=EnviroCompliance Laboratories :460032

ECL-R=EnviroCompliance Laboratories :460032

ECL-R=EnviroCompliance Laboratories :460032

Analysis was performed in accordance to NELAC requirements unless otherwise noted.

All methods are 40 CFR 136 March 12, 2007, Table IB approved.

Reference to Standard Methods is 18th ed.





## Analytical Summary

Enviro Compliance Laboratories, Inc.  
816 Kiwanis Street  
Hampton, Virginia 23661  
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Fax: (757) 244-3243  
www.envirocompliance.com  
ec1hampton@envirocompliance.com

City of Norfolk  
Attn: Ray Hernandez  
2233 McKann Avenue  
Norfolk, Virginia 23509

Project Name : Mason Creek  
Date Received: March 28, 2013  
Date Sampled : March 28, 2013  
Time Sampled : 09:43  
Date Issued : April 11, 2013

Lab # 1(A-G)/Sample ID : MC-1

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.03	mg/l	0.01	03-29/1430	03-29/1500	4500-PE	*ECL-R
Phosphorus	0.07	mg/l	0.01	03-29/1100	03-29/1415	4500-PE	*ECL-R
TKN	1.9	mg/l	0.1	04-01/0845	04-02/1000	4500NH3F	*ECL-R
Ammonia (as N)	0.3	mg/l	0.1	04-01/1330	04-01/1430	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	03-29/0930	03-29/0930	2540 F	*ECL-R
E. Coli	62	CFU/100ml	1	03-28/1540	03-29/1356	1603	*ECL-R
Enterococci	65	CFU/100ml	1	03-28/1540	03-29/1357	1600	*ECL-R
TSS	3.1	mg/l	1.0	04-02/1400	04-03/1445	2540 D	SDM
Total Nitrogen	1.9	mg/l	0.1	04-11/0947	04-11/0947	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	04-01/1100	04-01/1650	4500NO3E	SDM
Chlorophyll A	BQL	mg/m3	0.01	03-29/0900	04-04/0900	10200H	ECL
TOC	BQL	mg/l	10.0	03-29/1000	03-29/1210	5310	SDM

Lab # 2(A-G)/Sample ID : MC-2

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	BQL	mg/l	0.01	03-29/1430	03-29/1500	4500-PE	*ECL-R
Phosphorus	0.02	mg/l	0.01	03-29/1100	03-29/1415	4500-PE	*ECL-R
TKN	1.8	mg/l	0.1	04-01/0845	04-02/1000	4500NH3F	*ECL-R
Ammonia (as N)	0.1	mg/l	0.1	04-01/1330	04-01/1430	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	03-29/0930	03-29/0930	2540 F	*ECL-R
E. Coli	1	CFU/100ml	1	03-28/1540	03-29/1356	1603	*ECL-R
Enterococci	1	CFU/100ml	1	03-28/1540	03-29/1357	1600	*ECL-R
TSS	4.0	mg/l	1.0	04-02/1400	04-03/1445	2540 D	SDM
Total Nitrogen	1.8	mg/l	0.1	04-11/0947	04-11/0947	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	0.1	04-01/1100	04-01/1650	4500NO3E	SDM
Chlorophyll A	0.34	mg/m3	0.01	03-29/0900	04-04/0900	10200H	ECL
TOC	BQL	mg/l	10.0	03-29/1000	03-29/1210	5310	SDM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.





## Analytical Summary

Enviro Compliance Laboratories, Inc.  
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ec1hampton@envirocompliance.com

City of Norfolk  
Attn: Ray Hernandez  
2233 McKann Avenue  
Norfolk, Virginia 23509

Project Name : Mason Creek  
Date Received: March 28, 2013  
Date Sampled : March 28, 2013  
Time Sampled : 09:30  
Date Issued : April 11, 2013

Lab # 3(A-G)/Sample ID : MC-3

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	BQL	mg/l	0.01	03-29/1430	03-29/1500	4500-PE	*ECL-R
Phosphorus	0.02	mg/l	0.01	03-29/1100	03-29/1415	4500-PE	*ECL-R
TKN	1.8	mg/l	0.1	04-01/0845	04-02/1000	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	04-01/1330	04-01/1430	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	03-29/0930	03-29/0930	2540 F	*ECL-R
E. Coli	7	CFU/100ml	1	03-28/1540	03-29/1356	1603	*ECL-R
Enterococci	11	CFU/100ml	1	03-28/1540	03-29/1357	1600	*ECL-R
TSS	3.7	mg/l	1.0	04-02/1400	04-03/1445	2540 D	SDM
Total Nitrogen	1.8	mg/l	0.1	04-11/0947	04-11/0947	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	04-01/1100	04-01/1650	4500NO3E	SDM
Chlorophyll A	0.18	mg/m3	0.01	03-29/0900	04-04/0900	10200H	ECL
TOC	BQL	mg/l	10.0	03-29/1000	03-29/1210	5310	SDM

Lab # 4(A-G)/Sample ID : MC-4

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	BQL	mg/l	0.01	03-29/1430	03-29/1500	4500-PE	*ECL-R
Phosphorus	0.02	mg/l	0.01	03-29/1100	03-29/1415	4500-PE	*ECL-R
TKN	2.0	mg/l	0.1	04-01/0845	04-02/1000	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	04-01/1330	04-01/1430	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	03-29/0930	03-29/0930	2540 F	*ECL-R
E. Coli	< 1	CFU/100ml	1	03-28/1540	03-29/1356	1603	*ECL-R
Enterococci	20	CFU/100ml	1	03-28/1540	03-29/1357	1600	*ECL-R
TSS	5.0	mg/l	1.0	04-02/1400	04-03/1445	2540 D	SDM
Total Nitrogen	2.0	mg/l	0.1	04-11/0947	04-11/0947	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	04-01/1100	04-01/1650	4500NO3E	SDM
Chlorophyll A	0.13	mg/m3	0.01	03-29/0900	04-04/0900	10200H	ECL
TOC	BQL	mg/l	10.0	03-29/1000	03-29/1210	5310	SDM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.







## Analytical Summary

Enviro Compliance Laboratories, Inc.  
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City of Norfolk  
Attn: Ray Hernandez  
2233 McKann Avenue  
Norfolk, Virginia 23509

Project Name : Mason Creek  
Date Received: March 28, 2013  
Date Sampled : March 28, 2013  
Time Sampled : 10:55  
Date Issued : April 11, 2013

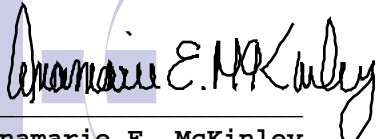
Lab # 5(A-G)/Sample ID : MC-5

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.01	mg/l	0.01	03-29/1430	03-29/1500	4500-PE	*ECL-R
Phosphorus	0.04	mg/l	0.01	03-29/1100	03-29/1415	4500-PE	*ECL-R
TKN	2.6	mg/l	0.1	04-01/0845	04-02/1000	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	04-01/1330	04-01/1430	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	03-29/0930	03-29/0930	2540 F	*ECL-R
E. Coli	3	CFU/100ml	1	03-28/1540	03-29/1356	1603	*ECL-R
Enterococci	13	CFU/100ml	1	03-28/1540	03-29/1357	1600	*ECL-R
TSS	4.6	mg/l	1.0	04-02/1400	04-03/1445	2540 D	SDM
Total Nitrogen	2.6	mg/l	0.1	04-11/0947	04-11/0947	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	04-01/1100	04-01/1650	4500NO3E	SDM
Chlorophyll A	0.06	mg/m3	0.01	03-29/0900	04-04/0900	10200H	ECL
TOC	BQL	mg/l	10.0	03-29/1000	03-29/1210	5310	SDM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.

  
Anamarie E. McKinley  
Laboratory Manager

Report #: H3329433 Page 3 of 4



VELAP ID#: 460130





## Report Annex

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### Abbreviations:

NR = Not Reported

ND = Not Detected

BQL = Below Quantitation Level (Result is less than stated QL)

< = Result is less than Quantitation Limit

### Quality Assurance Flags:

L = LCS did not meet method criteria.

H/B = Blank did not meet QC criteria

HT = Sample was not analyzed within holding times.

SR = Surrogate Recovery not available due to dilution.

R = Corr Coef <.995

C = Initial Instrument Calibration (Second Source) did not meet criteria

V = Continuing Calibration Verification did not meet criteria

S = Matrix Spike did not meet criteria

D = Duplicate did not meet criteria

OVR = Overrange- Sample was outside of calibration range

UnR = Underrange w/Diln.- Sample was below low standard because of dilution

TOX = Toxicity exhibited in BOD

G = GGA/Int. QC was not 198.5+/-30.5

Y = Yield not within 10-200mg

\* = Analysis was subcontracted

\*\* = Non-accreditable/non-accredited parameter

### Subcontractor Information:

Information for subcontracted analytical data.

ECL-R=EnviroCompliance Laboratories :460032

### Notes:

Analysis was performed in accordance to NELAC requirements unless otherwise noted.

All methods are 40 CFR 136 March 12, 2007, Table IB approved.

Reference to Standard Methods is 18th ed.





## Analytical Summary

Enviro Compliance Laboratories, Inc.  
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Moffatt & Nichol  
Attn: Brian Joyner  
800 World Trade Center  
Norfolk, VA 23510

Project Name : Mason Creek  
Date Received: May 13, 2013  
Date Sampled : May 13, 2013  
Time Sampled : 10:00  
Date Issued : June 06, 2013

Lab # 1(A-G)/Sample ID : MC-1

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.01	mg/l	0.01	05-14/1415	05-14/1430	4500-PE	*ECL-R
Phosphorus	0.09	mg/l	0.01	05-14/1030	05-14/1400	4500-PE	*ECL-R
TKN	2.9	mg/l	0.1	05-16/1300	05-16/1400	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	05-16/1300	05-16/1400	4500-NH3F	*ECL-R
Settleable Solids	5.5	ml/l/h	0.1	05-15/1025	05-15/1025	2540 F	*ECL-R
E. Coli	220	CFU/100ml	1	05-13/1605	05-14/1447	1603	*ECL-R
Enterococci	55	CFU/100ml	1	05-13/1605	05-14/1453	1600	*ECL-R
TSS	40.3	mg/l	1.0	05-17/1015	05-20/0810	2540 D	AEM
Total Nitrogen	2.9	mg/l	0.1	06-06/1534	06-06/1534	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	05-15/1100	05-15/1635	4500NO3E	SDM
Chlorophyll a	0.01	mg/m3	0.01	05-14/1415	05-14/1430	10200H	*ECL-R
TOC	BQL	mg/l	10.0	05-16/0900	05-16/1200	5310	SDM

Lab # 2(A-G)/Sample ID : MC-2

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.02	mg/l	0.01	05-14/1415	05-14/1430	4500-PE	*ECL-R
Phosphorus	0.11	mg/l	0.01	05-14/1030	05-14/1400	4500-PE	*ECL-R
TKN	8.3	mg/l	0.1	05-16/1300	05-16/1400	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	05-16/1300	05-16/1400	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	05-15/1025	05-15/1025	2540 F	*ECL-R
E. Coli	320	CFU/100ml	1	05-13/1605	05-14/1447	1603	*ECL-R
Enterococci	210	CFU/100ml	1	05-13/1605	05-14/1453	1600	*ECL-R
TSS	11.4	mg/l	1.0	05-17/1015	05-20/0810	2540 D	AEM
Total Nitrogen	8.3	mg/l	0.1	06-06/1534	06-06/1534	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	05-15/1100	05-15/1635	4500NO3E	SDM
Chlorophyll a	0.02	mg/m3	0.01	05-14/1415	05-14/1430	10200H	*ECL-R
TOC	BQL	mg/l	10.0	05-16/0900	05-16/1200	5310	SDM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.

= Sample was not analyzed within holding times.





## Analytical Summary

Enviro Compliance Laboratories, Inc.  
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ec1hampton@envirocompliance.com

Moffatt & Nichol  
Attn: Brian Joyner  
800 World Trade Center  
Norfolk, VA 23510

Project Name : Mason Creek  
Date Received: May 13, 2013  
Date Sampled : May 13, 2013  
Time Sampled : 10:30  
Date Issued : June 06, 2013

Lab # 3(A-G)/Sample ID : MC-3

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.01	mg/l	0.01	05-14/1415	05-14/1430	4500-PE	*ECL-R
Phosphorus	0.09	mg/l	0.01	05-14/1030	05-14/1400	4500-PE	*ECL-R
TKN	5.3	mg/l	0.1	05-16/1300	05-16/1400	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	05-16/1300	05-16/1400	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	05-15/1025	05-15/1025	2540 F	*ECL-R
E. Coli	420	CFU/100ml	1	05-13/1605	05-14/1447	1603	*ECL-R
Enterococci	40	CFU/100ml	1	05-13/1605	05-14/1453	1600	*ECL-R
TSS	20.0	mg/l	1.0	05-17/1015	05-20/0810	2540 D	AEM
Total Nitrogen	5.3	mg/l	0.1	06-06/1534	06-06/1534	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	05-15/1100	05-15/1635	4500NO3E	SDM
Chlorophyll a	0.01	mg/m3	0.01	05-14/1415	05-14/1430	10200H	*ECL-R
TOC	BQL	mg/l	10.0	05-16/0900	05-16/1200	5310	SDM

Lab # 4(A-G)/Sample ID : MC-4

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.02	mg/l	0.01	05-14/1415	05-14/1430	4500-PE	*ECL-R
Phosphorus	0.10	mg/l	0.01	05-14/1030	05-14/1400	4500-PE	*ECL-R
TKN	5.4	mg/l	0.1	05-16/1300	05-16/1400	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	05-16/1300	05-16/1400	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	05-15/1025	05-15/1025	2540 F	*ECL-R
E. Coli	1300	CFU/100ml	1	05-13/1605	05-14/1447	1603	*ECL-R
Enterococci	54	CFU/100ml	1	05-13/1605	05-14/1453	1600	*ECL-R
TSS	10.1	mg/l	1.0	05-17/1015	05-20/0810	2540 D	AEM
Total Nitrogen	5.4	mg/l	0.1	06-06/1534	06-06/1534	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	05-15/1100	05-15/1635	4500NO3E	SDM
Chlorophyll a	0.02	mg/m3	0.01	05-14/1415	05-14/1430	10200H	*ECL-R
TOC	BQL	mg/l	10.0	05-16/0900	05-16/1200	5310	SDM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.





## Analytical Summary

Enviro Compliance Laboratories, Inc.  
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Fax: (757) 244-3243  
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ec1hampton@envirocompliance.com

Moffatt & Nichol  
Attn: Brian Joyner  
800 World Trade Center  
Norfolk, VA 23510

Project Name : Mason Creek  
Date Received: May 13, 2013  
Date Sampled : May 13, 2013  
Time Sampled : 12:00  
Date Issued : June 06, 2013

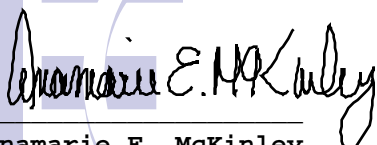
Lab # 5(A-G)/Sample ID : MC-5

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.03	mg/l	0.01	05-14/1415	05-14/1430	4500-PE	*ECL-R
Phosphorus	0.14	mg/l	0.01	05-14/1030	05-14/1400	4500-PE	*ECL-R
TKN	4.6	mg/l	0.1	05-16/1300	05-16/1400	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	05-16/1300	05-16/1400	4500-NH3F	*ECL-R
Settleable Solids	BQL	ml/l/h	0.1	05-15/1025	05-15/1025	2540 F	*ECL-R
E. Coli	3800	CFU/100ml	1	05-13/1605	05-14/1447	1603	*ECL-R
Enterococci	200	CFU/100ml	1	05-13/1605	05-14/1453	1600	*ECL-R
TSS	10.5	mg/l	1.0	05-17/1015	05-20/0810	2540 D	AEM
Total Nitrogen	4.6	mg/l	0.1	06-06/1534	06-06/1534	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	0.1	05-15/1100	05-15/1635	4500NO3E	SDM
Chlorophyll a	0.03	mg/m3	0.01	05-14/1415	05-14/1430	10200H	*ECL-R
TOC	BQL	mg/l	10.0	05-16/0900	05-16/1200	5310	SDM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.

  
Anamarie E. McKinley  
Laboratory Manager

Report #: H3529659 Page 3 of 4



VELAP ID#: 460130





## Report Annex

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### Abbreviations:

NR = Not Reported

ND = Not Detected

BQL = Below Quantitation Level (Result is less than stated QL)

< = Result is less than Quantitation Limit

### Quality Assurance Flags:

L = LCS did not meet method criteria.

H/B = Blank did not meet QC criteria

HT = Sample was not analyzed within holding times.

SR = Surrogate Recovery not available due to dilution.

R = Corr Coef <.995

C = Initial Instrument Calibration (Second Source) did not meet criteria

V = Continuing Calibration Verification did not meet criteria

S = Matrix Spike did not meet criteria

D = Duplicate did not meet criteria

OVR = Overrange- Sample was outside of calibration range

UnR = Underrange w/Diln.- Sample was below low standard because of dilution

TOX = Toxicity exhibited in BOD

G = GGA/Int. QC was not 198.5+/-30.5

Y = Yield not within 10-200mg

\* = Analysis was subcontracted

\*\* = Non-accreditable/non-accredited parameter

### Subcontractor Information:

Information for subcontracted analytical data.

ECL-R=EnviroCompliance Laboratories :460032

ECL-R=EnviroCompliance Laboratories :460032

ECL-R=EnviroCompliance Laboratories :460032

ECL-R=EnviroCompliance Laboratories :460032

ECL-R=EnviroCompliance Laboratories :460032

Analysis was performed in accordance to NELAC requirements unless otherwise noted.

All methods are 40 CFR 136 March 12, 2007, Table IB approved.

Reference to Standard Methods is 18th ed.





## Analytical Summary

Enviro Compliance Laboratories, Inc.  
816 Kiwanis Street  
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www.envirocompliance.com  
ec1hampton@envirocompliance.com

Moffatt & Nichol  
Attn: Brian Joyner  
800 World Trade Center  
Norfolk, VA 23510

Project Name : Mason Creek  
Date Received: June 11, 2013  
Date Sampled : June 11, 2013  
Time Sampled : 11:25  
Date Issued : July 09, 2013

Lab # 1(A-G)/Sample ID : MC-1

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.05	mg/l	0.01	06-12/1440	06-12/1500	4500-PE	*ECL-R
Phosphorus	BQL	mg/l	1.0	06-14/1100	06-14/1340	4500-PE	*ECL-R
TKN	9.0	mg/l	0.1	06-12/0845	06-13/0945	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	06-13/1130	06-13/1200	4500-NH3F	AMW
Settleable Solids	HT BQL	ml/l/h	0.1	>06-13/1325	06-13/1325	2540 F	MRP
E. Coli	340	CFU/100ml	1	06-11/1603	06-12/1422	1603	*ECL-R
Enterococci	2700	CFU/100ml	1	06-11/1617	06-12/1423	1600	*ECL-R
TSS	46.5	mg/l	1.0	06-13/0940	06-16/1510	2540 D	AEM
Total Nitrogen	10.1	mg/l	0.1	07-09/1825	07-09/1825	calc.	AEM
Nitrate+Nitrite	1.1	mg/l	0.1	06-12/1357	06-13/1505	4500NO3E	AEM
Chlorophyll a	3.05	mg/m3	0.01	06-12/0900	06-24/0900	10200H	*ECL-R
TOC	1.2	mg/l	1.0	07-09/1121	07-09/1715	5310	KLM

Lab # 2(A-G)/Sample ID : MC-2

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.03	mg/l	0.01	06-12/1440	06-12/1500	4500-PE	*ECL-R
Phosphorus	0.10	mg/l	0.01	06-14/1100	06-14/1340	4500-PE	*ECL-R
TKN	3.1	mg/l	0.1	06-12/0845	06-13/0945	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	06-13/1130	06-13/1200	4500-NH3F	AMW
Settleable Solids	HT BQL	ml/l/h	0.1	>06-13/1325	06-13/1325	2540 F	MRP
E. Coli	56	CFU/100ml	1	06-11/1603	06-12/1422	1603	*ECL-R
Enterococci	360	CFU/100ml	1	06-11/1617	06-12/1423	1600	*ECL-R
TSS	16.0	mg/l	1.0	06-13/0940	06-16/1510	2540 D	AEM
Total Nitrogen	3.1	mg/l	0.1	07-09/1825	07-09/1825	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	06-12/1357	06-13/1505	4500NO3E	AEM
Chlorophyll a	0.49	mg/m3	0.01	06-12/0900	06-24/0900	10200H	*ECL-R
TOC	BQL	mg/l	1.0	07-09/1121	07-09/1715	5310	KLM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.

HT = Sample was not analyzed within holding times.





## Analytical Summary

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ec1hampton@envirocompliance.com

Moffatt & Nichol  
Attn: Brian Joyner  
800 World Trade Center  
Norfolk, VA 23510

Project Name : Mason Creek  
Date Received: June 11, 2013  
Date Sampled : June 11, 2013  
Time Sampled : 12:07  
Date Issued : July 09, 2013

Lab # 3(A-G)/Sample ID : MC-3

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.03	mg/l	0.01	06-12/1440	06-12/1500	4500-PE	*ECL-R
Phosphorus	0.13	mg/l	0.01	06-14/1100	06-14/1340	4500-PE	*ECL-R
TKN	4.8	mg/l	0.1	06-12/0845	06-13/0945	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	06-13/1130	06-13/1200	4500-NH3F	AMW
Settleable Solids	HT BQL	ml/l/h	0.1	>06-13/1325	06-13/1325	2540 F	MRP
E. Coli	170	CFU/100ml	1	06-11/1603	06-12/1422	1603	*ECL-R
Enterococci	210	CFU/100ml	1	06-11/1617	06-12/1423	1600	*ECL-R
TSS	21.3	mg/l	1.0	06-13/0940	06-16/1510	2540 D	AEM
Total Nitrogen	4.8	mg/l	0.1	07-09/1825	07-09/1825	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	06-12/1357	06-13/1505	4500NO3E	AEM
Chlorophyll a	1.48	mg/m3	0.01	06-12/0900	06-24/0900	10200H	*ECL-R
TOC	8.9	mg/l	1.0	07-09/1121	07-09/1715	5310	KLM

Lab # 4(A-G)/Sample ID : MC-4

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.04	mg/l	0.01	06-12/1440	06-12/1500	4500-PE	*ECL-R
Phosphorus	0.12	mg/l	0.01	06-14/1100	06-14/1340	4500-PE	*ECL-R
TKN	2.6	mg/l	0.1	06-12/0845	06-13/0945	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	06-13/1130	06-13/1200	4500-NH3F	AMW
Settleable Solids	HT BQL	ml/l/h	0.1	>06-13/1325	06-13/1325	2540 F	MRP
E. Coli	130	CFU/100ml	1	06-11/1603	06-12/1422	1603	*ECL-R
Enterococci	250	CFU/100ml	1	06-11/1617	06-12/1423	1600	*ECL-R
TSS	18.3	mg/l	1.0	06-13/0940	06-16/1510	2540 D	AEM
Total Nitrogen	2.6	mg/l	0.1	07-09/1825	07-09/1825	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	06-12/1357	06-13/1505	4500NO3E	AEM
Chlorophyll a	1.44	mg/m3	0.01	06-12/0900	06-24/0900	10200H	*ECL-R
TOC	5.1	mg/l	1.0	07-09/1121	07-09/1715	5310	KLM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.

HT = Sample was not analyzed within holding times.







## Analytical Summary

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Moffatt & Nichol  
Attn: Brian Joyner  
800 World Trade Center  
Norfolk, VA 23510

Project Name : Mason Creek  
Date Received: June 11, 2013  
Date Sampled : June 11, 2013  
Time Sampled : 10:50  
Date Issued : July 09, 2013

Lab # 5(A-G)/Sample ID : MC-5

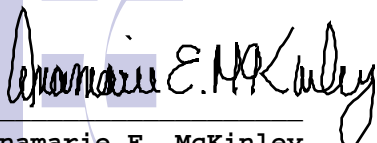
Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.19	mg/l	0.01	06-12/1440	06-12/1500	4500-PE	*ECL-R
Phosphorus	0.29	mg/l	0.01	06-14/1100	06-14/1340	4500-PE	*ECL-R
TKN	5.3	mg/l	0.1	06-12/0845	06-13/0945	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	06-13/1130	06-13/1200	4500-NH3F	AMW
Settleable Solids	HT 0.3	ml/l/h	0.1	>06-13/1325	06-13/1325	2540 F	MRP
E. Coli	1700	CFU/100ml	1	06-11/1603	06-12/1422	1603	*ECL-R
Enterococci	5300	CFU/100ml	1	06-11/1617	06-12/1423	1600	*ECL-R
TSS	50.0	mg/l	1.0	06-13/0940	06-16/1510	2540 D	AEM
Total Nitrogen	5.3	mg/l	0.1	07-09/1825	07-09/1825	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	1.0	06-12/1357	06-13/1505	4500NO3E	AEM
Chlorophyll a	2.97	mg/m3	0.01	06-12/0900	06-24/0900	10200H	*ECL-R
TOC	HT 5.6	mg/l	1.0	>07-09/1121	07-09/1715	5310	KLM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.

HT = Sample was not analyzed within holding times.

  
Anamarie E. McKinley  
Laboratory Manager

Report #: H3629762 Page 3 of 4



VELAP ID#: 460130





## Report Annex

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### Abbreviations:

NR = Not Reported

ND = Not Detected

BQL = Below Quantitation Level (Result is less than stated QL)

< = Result is less than Quantitation Limit

### Quality Assurance Flags:

L = LCS did not meet method criteria.

H/B = Blank did not meet QC criteria

HT = Sample was not analyzed within holding times.

SR = Surrogate Recovery not available due to dilution.

R = Corr Coef <.995

C = Initial Instrument Calibration (Second Source) did not meet criteria

V = Continuing Calibration Verification did not meet criteria

S = Matrix Spike did not meet criteria

D = Duplicate did not meet criteria

OVR = Overrange- Sample was outside of calibration range

UnR = Underrange w/Diln.- Sample was below low standard because of dilution

TOX = Toxicity exhibited in BOD

G = GGA/Int. QC was not 198.5+/-30.5

Y = Yield not within 10-200mg

\* = Analysis was subcontracted

\*\* = Non-accreditable/non-accredited parameter

### Subcontractor Information:

Information for subcontracted analytical data.

ECL-R=EnviroCompliance Laboratories :460032

### Notes:

Analysis was performed in accordance to NELAC requirements unless otherwise noted.

All methods are 40 CFR 136 March 12, 2007, Table IB approved.

Reference to Standard Methods is 18th ed.





## Analytical Summary

Enviro Compliance Laboratories, Inc.  
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Moffatt & Nichol  
Attn: Brian Joyner  
800 World Trade Center  
Norfolk, VA 23510

Project No. : 7607-06  
Project Name : Mason Creek  
Date Received: July 03, 2013  
Date Sampled : July 03, 2013  
Time Sampled : 10:00  
Date Issued : August 21, 2013

Lab # 1(A-G)/Sample ID : MC-1

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.11	mg/l	0.01	07-03/1530	07-03/1545	4500-PE	*ECL-R
Phosphorus	0.16	mg/l	0.01	07-05/1000	07-05/1145	4500-P E	*ECL-R
TKN	1.4	mg/l	0.1	07-05/0845	07-08/1030	4500NH3F	*ECL-R
Ammonia (as N)	0.1	mg/l	0.1	07-08/1300	07-08/1400	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	0.1	07-05/1415	07-05/1415	2540 F	*ECL-R
E. Coli	3200	CFU/100ml	1	07-03/1618	07-04/1314	1603	*ECL-R
Enterococci	2800	CFU/100ml	1	07-03/1618	07-04/1314	1600	*ECL-R
TSS	23.8	mg/l	1.0	07-09/0848	07-10/1300	2540 D	AEM
Total Nitrogen	1.5	mg/l	0.1	08-21/1303	08-21/1303	calc.	AEM
Nitrate+Nitrite	0.1	mg/l	0.1	08-19/1100	08-19/1640	4500NO3E	AEM
Chlorophyll a**	0.53	mg/m3	0.01	07-04/1500	07-04/1500	10200H	*ECL-R
TOC	4.1	mg/l	1.0	07-09/1121	07-09/1715	5310	KLM

Lab # 2(A-G)/Sample ID : MC-2

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.05	mg/l	0.01	07-03/1530	07-03/1545	4500-PE	*ECL-R
Phosphorus	0.09	mg/l	0.01	07-05/1000	07-05/1145	4500-P E	*ECL-R
TKN	1.2	mg/l	0.1	07-05/0845	07-08/1030	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	07-08/1300	07-08/1400	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	0.1	07-05/1415	07-05/1415	2540 F	*ECL-R
E. Coli	57	CFU/100ml	1	07-03/1618	07-04/1314	1603	*ECL-R
Enterococci	170	CFU/100ml	1	07-03/1618	07-04/1314	1600	*ECL-R
TSS	12.0	mg/l	1.0	07-09/0848	07-10/1300	2540 D	AEM
Total Nitrogen	1.2	mg/l	0.1	08-21/1303	08-21/1303	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	0.1	08-19/1100	08-19/1640	4500NO3E	AEM
Chlorophyll a**	0.53	mg/m3	0.01	07-04/1500	07-04/1500	10200H	*ECL-R
TOC	13.9	mg/l	1.0	07-09/1121	07-09/1715	5310	KLM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.





## Analytical Summary

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ec1hampton@envirocompliance.com

Moffatt & Nichol  
Attn: Brian Joyner  
800 World Trade Center  
Norfolk, VA 23510

Project No. : 7607-06  
Project Name : Mason Creek  
Date Received: July 03, 2013  
Date Sampled : July 03, 2013  
Time Sampled : 10:50  
Date Issued : August 21, 2013

Lab # 3(A-G)/Sample ID : MC-3

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.07	mg/l	0.01	07-03/1530	07-03/1545	4500-PE	*ECL-R
Phosphorus	0.16	mg/l	0.01	07-05/1000	07-05/1145	4500-P E	*ECL-R
TKN	1.9	mg/l	0.1	07-05/0845	07-08/1030	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	07-08/1300	07-08/1400	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	0.1	07-05/1415	07-05/1415	2540 F	*ECL-R
E. Coli	110	CFU/100ml	1	07-03/1618	07-04/1314	1603	*ECL-R
Enterococci	340	CFU/100ml	1	07-03/1618	07-04/1314	1600	*ECL-R
TSS	18.2	mg/l	1.0	07-09/0848	07-10/1300	2540 D	AEM
Total Nitrogen	1.9	mg/l	0.1	08-21/1303	08-21/1303	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	0.1	08-19/1100	08-19/1640	4500NO3E	AEM
Chlorophyll a**	2.54	mg/m3	0.01	07-04/1500	07-04/1500	10200H	*ECL-R
TOC	BQL	mg/l	1.0	07-09/1121	07-09/1715	5310	KLM

Lab # 4(A-G)/Sample ID : MC-4

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.09	mg/l	0.01	07-03/1530	07-03/1545	4500-PE	*ECL-R
Phosphorus	0.20	mg/l	0.01	07-05/1000	07-05/1145	4500-P E	*ECL-R
TKN	2.3	mg/l	0.1	07-05/0845	07-08/1030	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	07-08/1300	07-08/1400	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	0.1	07-05/1415	07-05/1415	2540 F	*ECL-R
E. Coli	100	CFU/100ml	1	07-03/1618	07-04/1314	1603	*ECL-R
Enterococci	220	CFU/100ml	1	07-03/1618	07-04/1314	1600	*ECL-R
TSS	85.0	mg/l	1.0	07-09/0848	07-10/1300	2540 D	AEM
Total Nitrogen	2.3	mg/l	0.1	08-21/1303	08-21/1303	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	0.1	08-19/1100	08-19/1640	4500NO3E	AEM
Chlorophyll a**	1.63	mg/m3	0.01	07-04/1500	07-04/1500	10200H	*ECL-R
TOC	BQL	mg/l	1.0	07-09/1121	07-09/1715	5310	KLM

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.





## Analytical Summary

Enviro Compliance Laboratories, Inc.  
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ec1hampton@envirocompliance.com

Moffatt & Nichol  
Attn: Brian Joyner  
800 World Trade Center  
Norfolk, VA 23510

Project No. : 7607-06  
Project Name : Mason Creek  
Date Received: July 03, 2013  
Date Sampled : July 03, 2013  
Time Sampled : 11:40  
Date Issued : August 21, 2013

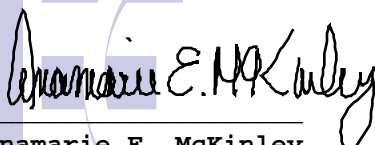
Lab # 5(A-G)/Sample ID : MC-5

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.26	mg/l	0.01	07-03/1530	07-03/1545	4500-PE	*ECL-R
Phosphorus	0.31	mg/l	0.01	07-05/1000	07-05/1145	4500-P E	*ECL-R
TKN	1.6	mg/l	0.1	07-05/0845	07-08/1030	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	07-08/1300	07-08/1400	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	0.1	07-05/1415	07-05/1415	2540 F	*ECL-R
E. Coli	1200	CFU/100ml	1	07-03/1618	07-04/1314	1603	*ECL-R
Enterococci	200	CFU/100ml	1	07-03/1618	07-04/1314	1600	*ECL-R
TSS	8.2	mg/l	1.0	07-09/0848	07-10/1300	2540 D	AEM
Total Nitrogen	1.6	mg/l	0.1	08-21/1303	08-21/1303	calc.	AEM
Nitrate+Nitrite	BQL	mg/l	0.1	08-19/1100	08-19/1640	4500NO3E	AEM
Chlorophyll a**	1.59	mg/m3	0.01	07-04/1500	07-04/1500	10200H	*ECL-R
TOC	BQL	mg/l	1.0	07-09/1121	07-09/1715	5310	KLM

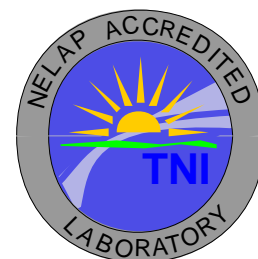
BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.

  
Anamarie E. McKinley  
Laboratory Manager

Report #: H3729877 Page 3 of 4



VELAP ID#: 460130





## Report Annex

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### Abbreviations:

NR = Not Reported

ND = Not Detected

BQL = Below Quantitation Level (Result is less than stated QL)

< = Result is less than Quantitation Limit

### Quality Assurance Flags:

L = LCS did not meet method criteria.

H/B = Blank did not meet QC criteria

HT = Sample was not analyzed within holding times.

SR = Surrogate Recovery not available due to dilution.

R = Corr Coef <.995

C = Initial Instrument Calibration (Second Source) did not meet criteria

V = Continuing Calibration Verification did not meet criteria

S = Matrix Spike did not meet criteria

D = Duplicate did not meet criteria

OVR = Overrange- Sample was outside of calibration range

UnR = Underrange w/Diln.- Sample was below low standard because of dilution

TOX = Toxicity exhibited in BOD

G = GGA/Int. QC was not 198.5+/-30.5

Y = Yield not within 10-200mg

\* = Analysis was subcontracted

\*\* = Non-accreditable/non-accredited parameter

### Subcontractor Information:

Information for subcontracted analytical data.

ECL-R=EnviroCompliance Laboratories :460032

Analysis was performed in accordance to NELAC requirements unless otherwise noted.

All methods are 40 CFR 136 March 12, 2007, Table IB approved.

Reference to Standard Methods is 18th ed.

Report #: H3729877 Page 4 of 4

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## Analytical Summary

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Moffatt & Nichol  
Attn: Brian Joyner  
800 World Trade Center  
Norfolk, VA 23510

Project No. : 7607-06  
Project Name : Mason Creek  
Date Received: August 27, 2013  
Date Sampled : August 27, 2013  
Time Sampled : 10:40  
Date Issued : November 05, 2013

Lab # 1(A-G)/Sample ID : MC-1

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.05	mg/l	.01	08-28/1430	08-28/1500	4500-P F	*ECL-R
Phosphorus	0.25	mg/l	.01	09-05/1230	09-05/1545	4500-P E	*ECL-R
TKN	3.7	mg/l	0.1	08-28/0900	08-29/0945	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	.1	09-06/1215	09-06/1310	4500-NH3F	*ECL-R
Settleable Solids**	0.10	ml/l/h	.10	08-30/1000	08-30/1000	2540 F	*ECL-R
E. Coli	46	CFU/100ml	1	08-27/1551	08-28/1416	1603	*ECL-R
Enterococci	210	CFU/100ml	1	08-27/1551	08-28/1417	1600	*ECL-R
TSS	46.0	mg/l	1.8	08-30/0915	08-30/1115	2540 D	*ECL-R
TKN	3.7	mg/l	.1	08-28/0900	08-29/0945	4500N C/F	*ECL-R
Total Nitrogen	3.7	mg/l	.1	11-05/	11-05/	calc.	*ECL-R
Nitrate+Nitrite	BQL	mg/l	.10	09-13/1130	09-13/1515	4500NO3E	MAC
Chlorophyll a**	3.27	mg/m3	.01	08-27/1600	10-23/1500	10200H	*ECL-R
TOC	BQL	mg/l	10.0	09-06/0900	09-06/0900	5310	*SUM-O

Lab # 2(A-G)/Sample ID : MC-2

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.05	mg/l	.01	08-28/1430	08-28/1500	4500-P F	*ECL-R
Phosphorus	0.12	mg/l	.01	09-05/1230	09-05/1545	4500-P E	*ECL-R
TKN	1.1	mg/l	0.1	08-28/0900	08-29/0945	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	09-06/1215	09-06/1310	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	.10	08-30/1000	08-30/1000	2540 F	*ECL-R
E. Coli	3	CFU/100ml	1	08-27/1556	08-28/1418	1603	*ECL-R
Enterococci	23	CFU/100ml	1	08-27/1556	08-28/1419	1600	*ECL-R
TSS	44.3	mg/l	1.1	08-30/0915	08-30/1115	2540 D	*ECL-R
TKN	1.1	mg/l	.1	08-28/0900	08-29/0945	4500N C/F	*ECL-R
Total Nitrogen	1.1	mg/l	.1	11-05/	11-05/	calc.	*ECL-R
Nitrate+Nitrite	BQL	mg/l	.10	09-13/1130	09-13/1515	4500NO3E	MAC
Chlorophyll a**	1.12	mg/m3	.01	08-27/1600	10-23/1500	10200H	*ECL-R
TOC	BQL	mg/l	10.0	09-06/0900	09-06/0900	5310	*SUM-O

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.





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Moffatt & Nichol  
Attn: Brian Joyner  
800 World Trade Center  
Norfolk, VA 23510

Project No. : 7607-06  
Project Name : Mason Creek  
Date Received: August 27, 2013  
Date Sampled : August 27, 2013  
Time Sampled : 11:13  
Date Issued : November 05, 2013

Lab # 3(A-G)/Sample ID : MC-3

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.05	mg/l	.01	08-28/1430	08-28/1500	4500-P F	*ECL-R
Phosphorus	0.14	mg/l	.01	09-05/1230	09-05/1545	4500-P E	*ECL-R
TKN	1.6	mg/l	0.1	08-28/0900	08-29/0945	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	09-06/1215	09-06/1310	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	.10	08-30/1000	08-30/1000	2540 F	*ECL-R
E. Coli	10	CFU/100ml	1	08-27/1609	08-28/1425	1603	*ECL-R
Enterococci	470	CFU/100ml	1	08-27/1609	08-28/1425	1600	*ECL-R
TSS	39.1	mg/l	1.1	08-30/0915	08-30/1115	2540 D	*ECL-R
TKN	1.6	mg/l	.1	08-28/0900	08-29/0945	4500N C/F	*ECL-R
Total Nitrogen	1.6	mg/l	.1	11-05/	11-05/	calc.	*ECL-R
Nitrate+Nitrite	BQL	mg/l	.10	09-13/1130	09-13/1515	4500NO3E	MAC
Chlorophyll a**	0.40	mg/m3	.01	08-27/1600	10-23/1500	10200H	*ECL-R
TOC	BQL	mg/l	10.0	09-06/0900	09-06/0900	5310	*SUM-O

Lab # 4(A-G)/Sample ID : MC-4

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.05	mg/l	.01	08-28/1430	08-28/1500	4500-P F	*ECL-R
Phosphorus	0.16	mg/l	.01	09-05/1230	09-05/1545	4500-P E	*ECL-R
TKN	2.5	mg/l	0.1	08-28/0900	08-29/0945	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	09-06/1215	09-06/1310	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	.10	08-30/1000	08-30/1000	2540 F	*ECL-R
E. Coli	25	CFU/100ml	1	08-27/1600	08-28/1420	1603	*ECL-R
Enterococci	480	CFU/100ml	1	08-27/1600	08-27/1420	1600	*ECL-R
TSS	57.1	mg/l	1.4	08-30/0915	08-30/1115	2540 D	*ECL-R
TKN	2.5	mg/l	.1	08-28/0900	08-29/0945	4500N C/F	*ECL-R
Total Nitrogen	2.5	mg/l	.1	11-05/	11-05/	calc.	*ECL-R
Nitrate+Nitrite	BQL	mg/l	.10	09-13/1130	09-13/1515	4500NO3E	MAC
Chlorophyll a**	1.36	mg/m3	.01	08-27/1600	10-23/1500	10200H	*ECL-R
TOC	BQL	mg/l	10.0	09-06/0900	09-06/0900	5310	*SUM-O

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.







## Analytical Summary

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Moffatt & Nichol  
Attn: Brian Joyner  
800 World Trade Center  
Norfolk, VA 23510

Project No. : 7607-06  
Project Name : Mason Creek  
Date Received: August 27, 2013  
Date Sampled : August 27, 2013  
Time Sampled : 11:38  
Date Issued : November 05, 2013

Lab # 5(A-G)/Sample ID : MC-5

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.15	mg/l	.01	08-28/1430	08-28/1500	4500-P F	*ECL-R
Phosphorus	0.27	mg/l	.01	09-05/1230	09-05/1545	4500-P E	*ECL-R
TKN	1.9	mg/l	0.1	08-28/0900	08-29/0945	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	09-06/1215	09-06/1310	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	.10	08-30/1000	08-30/1000	2540 F	*ECL-R
E. Coli	33	CFU/100ml	1	08-27/1614	08-28/1428	1603	*ECL-R
Enterococci	860	CFU/100ml	1	08-27/1614	08-28/1429	1600	*ECL-R
TSS	40.0	mg/l	1.4	08-30/0915	08-30/1115	2540 D	*ECL-R
TKN	1.9	mg/l	.1	08-28/0900	08-29/0945	4500N C/F	*ECL-R
Total Nitrogen	1.9	mg/l	.1	11-05/	11-05/	calc.	*ECL-R
Nitrate+Nitrite	BQL	mg/l	.10	09-13/1130	09-13/1515	4500NO3E	MAC
Chlorophyll a**	2.33	mg/m3	.01	08-27/1600	10-23/1500	10200H	*ECL-R
TOC	BQL	mg/l	10.0	09-06/0900	09-06/0900	5310	*SUM-O

Lab # 6(A-G)/Sample ID : MC-6

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.03	mg/l	.01	08-28/1430	08-28/1500	4500-P F	*ECL-R
Phosphorus	0.08	mg/l	.01	09-05/1230	09-05/1545	4500-P E	*ECL-R
TKN	0.8	mg/l	0.1	08-28/0900	08-29/0945	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	0.1	09-06/1215	09-06/1310	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	.10	08-30/1000	08-30/1000	2540 F	*ECL-R
E. Coli	< 1	CFU/100ml	1	08-27/1605	08-28/1423	1603	*ECL-R
Enterococci	49	CFU/100ml	1	08-27/1605	08-28/1423	1600	*ECL-R
TSS	47.9	mg/l	1.0	08-30/0915	08-30/1115	2540 D	*ECL-R
TKN	0.8	mg/l	.1	08-28/0900	08-29/0945	4500N C/F	*ECL-R
Total Nitrogen	0.8	mg/l	.1	11-05/	11-05/	calc.	*ECL-R
Nitrate+Nitrite	BQL	mg/l	.10	09-13/1130	09-13/1515	4500NO3E	MAC
Chlorophyll a**	0.76	mg/m3	.01	08-27/1600	10-23/1500	10200H	*ECL-R
TOC	BQL	mg/l	10.0	09-06/0900	09-06/0900	5310	*SUM-O

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.

Greg L. Hudson  
Laboratory Director

Report #: H3830060 Page 3 of 4

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VELAP ID#: 460130



## Report Annex

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eclhampton@envirocompliance.com

### Abbreviations:

NR = Not Reported

ND = Not Detected

BQL = Below Quantitation Level (Result is less than stated QL)

< = Result is less than Quantitation Limit

### Quality Assurance Flags:

L = LCS did not meet method criteria.

H/B = Blank did not meet QC criteria

HT = Sample was not analyzed within holding times.

SR = Surrogate Recovery not available due to dilution.

R = Corr Coef <.995

C = Initial Instrument Calibration (Second Source) did not meet criteria

V = Continuing Calibration Verification did not meet criteria

S = Matrix Spike did not meet criteria

D = Duplicate did not meet criteria

OVR = Overrange- Sample was outside of calibration range

UnR = Underrange w/Diln.- Sample was below low standard because of dilution

TOX = Toxicity exhibited in BOD

G = GGA/Int. QC was not 198.5+/-30.5

Y = Yield not within 10-200mg

\* = Analysis was subcontracted

\*\* = Non-accreditable/non-accredited parameter

### Subcontractor Information:

Information for subcontracted analytical data.

ECL-R=EnviroCompliance Laboratories :460032

SUM-OH=Summit Lab :460141

Reference to Standard Methods is 18th ed.

Report #: H3830060 Page 4 of 4

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Moffatt & Nichol  
Attn: Brian Joyner  
800 World Trade Center  
Norfolk, VA 23510

Project No. : 7607-06  
Project Name : Mason Creek  
Date Received: September 19, 2013  
Date Sampled : September 19, 2013  
Time Sampled : 10:24  
Date Issued : November 05, 2013

Lab # 1(A-H)/Sample ID : MC-1

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.04	mg/l	.01	09-20/1515	09-20/1530	4500-P F	*ECL-R
Phosphorus	0.08	mg/l	.01	09-24/1230	09-24/1400	4500-P E	*ECL-R
TKN	1.3	mg/l	.1	09-20/0915	09-23/1000	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	.1	09-20/1300	09-20/1345	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	.10	09-24/0930	09-24/0930	2540 F	*ECL-R
E. Coli	< 1	CFU/100ml	1	09-19/1619	09-20/1548	1603	*ECL-R
Enterococci	25	CFU/100ml	1	09-19/1619	09-20/1433	1600	*ECL-R
TSS	21.1	mg/l	1.0	09-23/1000	09-23/1115	2540 D	*ECL-R
TKN	1.3	mg/l	.1	09-20/0915	09-23/1000	4500N C/F	*ECL-R
Total Nitrogen	1.4	mg/l	.1	11-05/	11-05/	calc.	*ECL-R
Nitrate+Nitrite	0.11	mg/l	.10	10-07/0930	10-07/1600	4500NO3E	*ECL-R
Chlorophyll a**	1.61	mg/m3	.01	09-19/1630	10-23/1500	10200H	*ECL-R
TOC	42.8	mg/l	10.0	10-03/0930	10-03/1700	5310	MAC

Lab # 2(A-H)/Sample ID : MC-2

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.03	mg/l	.01	09-20/1515	09-20/1530	4500-P F	*ECL-R
Phosphorus	0.06	mg/l	.01	09-24/1230	09-24/1400	4500-P E	*ECL-R
TKN	0.8	mg/l	.1	09-20/0915	09-23/1000	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	.1	09-20/1300	09-20/1345	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	.10	09-24/0930	09-24/0930	2540 F	*ECL-R
E. Coli	< 1	CFU/100ml	1	09-19/1624	09-20/1548	1603	*ECL-R
Enterococci	< 1	CFU/100ml	1	09-19/1624	09-20/1435	1600	*ECL-R
TSS	26.0	mg/l	1.0	09-23/1000	09-23/1115	2540 D	*ECL-R
TKN	0.8	mg/l	.1	09-20/0915	09-23/1000	4500N C/F	*ECL-R
Total Nitrogen	0.8	mg/l	.1	11-05/	11-05/	calc.	*ECL-R
Nitrate+Nitrite	BQL	mg/l	.10	10-07/0930	10-07/1600	4500NO3E	*ECL-R
Chlorophyll a**	0.77	mg/m3	.01	09-19/1630	10-23/1500	10200H	*ECL-R
TOC	BQL	mg/l	10.0	10-03/0930	10-03/1700	5310	MAC

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.





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Moffatt & Nichol  
Attn: Brian Joyner  
800 World Trade Center  
Norfolk, VA 23510

Project No. : 7607-06  
Project Name : Mason Creek  
Date Received: September 19, 2013  
Date Sampled : September 19, 2013  
Time Sampled : 10:55  
Date Issued : November 05, 2013

Lab # 3(A-H)/Sample ID : MC-3

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.02	mg/l	.01	09-20/1515	09-20/1530	4500-P F	*ECL-R
Phosphorus	0.04	mg/l	.01	09-24/1230	09-24/1400	4500-P E	*ECL-R
TKN	2.1	mg/l	.1	09-20/0915	09-23/1000	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	.1	09-20/1300	09-20/1345	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	.10	09-24/0930	09-24/0930	2540 F	*ECL-R
E. Coli	3	CFU/100ml	1	09-19/1628	09-20/1548	1603	*ECL-R
Enterococci	36	CFU/100ml	1	09-19/1628	09-20/1436	1600	*ECL-R
TSS	15.5	mg/l	1.0	09-23/1000	09-23/1115	2540 D	*ECL-R
TKN	2.1	mg/l	.1	09-20/0915	09-23/1000	4500N C/F	*ECL-R
Total Nitrogen	2.1	mg/l	.1	11-05/	11-05/	calc.	*ECL-R
Nitrate+Nitrite	BQL	mg/l	.10	10-07/0930	10-07/1600	4500NO3E	*ECL-R
Chlorophyll a**	0.88	mg/m3	.01	09-19/1630	10-23/1500	10200H	*ECL-R
TOC	BQL	mg/l	10.0	10-03/0930	10-03/1700	5310	MAC

Lab # 4(A-H)/Sample ID : MC-4

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.02	mg/l	.01	09-20/1515	09-20/1530	4500-P F	*ECL-R
Phosphorus	0.05	mg/l	.01	09-24/1230	09-24/1400	4500-P E	*ECL-R
TKN	0.7	mg/l	.1	09-20/0915	09-23/1000	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	.1	09-20/1300	09-20/1345	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	.10	09-24/0930	09-24/0930	2540 F	*ECL-R
E. Coli	9	CFU/100ml	1	09-19/1632	09-20/1549	1603	*ECL-R
Enterococci	31	CFU/100ml	1	09-19/1632	09-20/1438	1600	*ECL-R
TSS	19.0	mg/l	1.0	09-23/1000	09-23/1115	2540 D	*ECL-R
TKN	0.7	mg/l	.1	09-20/0915	09-23/1000	4500N C/F	*ECL-R
Total Nitrogen	0.7	mg/l	.1	11-05/	11-05/	calc.	*ECL-R
Nitrate+Nitrite	BQL	mg/l	.10	10-07/0930	10-07/1600	4500NO3E	*ECL-R
Chlorophyll a**	0.26	mg/m3	.01	09-19/1630	10-23/1500	10200H	*ECL-R
TOC	BQL	mg/l	10.0	10-03/0930	10-03/1700	5310	MAC

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.





## Analytical Summary

Enviro Compliance Laboratories, Inc.  
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Moffatt & Nichol  
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800 World Trade Center  
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Project No. : 7607-06  
Project Name : Mason Creek  
Date Received: September 19, 2013  
Date Sampled : September 19, 2013  
Time Sampled : 11:35  
Date Issued : November 05, 2013

Lab # 5(A-H)/Sample ID : MC-5

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.04	mg/l	.01	09-20/1515	09-20/1530	4500-P F	*ECL-R
Phosphorus	0.09	mg/l	.01	09-24/1230	09-24/1400	4500-P E	*ECL-R
TKN	1.0	mg/l	.1	09-20/0915	09-23/1000	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	.1	09-20/1300	09-20/1345	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	.10	09-24/0930	09-24/0930	2540 F	*ECL-R
E. Coli	71	CFU/100ml	1	09-19/1636	09-20/1549	1603	*ECL-R
Enterococci	30	CFU/100ml	1	09-19/1634	09-20/1440	1600	*ECL-R
TSS	21.2	mg/l	1.0	09-23/1000	09-23/1115	2540 D	*ECL-R
TKN	1.0	mg/l	.1	09-20/0915	09-23/1000	4500N C/F	*ECL-R
Total Nitrogen	1.0	mg/l	.1	11-05/	11-05/	calc.	*ECL-R
Nitrate+Nitrite	BQL	mg/l	.10	10-07/0930	10-07/1600	4500NO3E	*ECL-R
Chlorophyll a**	1.02	mg/m3	.01	09-19/1630	10-23/1500	10200H	*ECL-R
TOC	BQL	mg/l	10.0	10-03/0930	10-03/1700	5310	MAC

Lab # 6(A-H)/Sample ID : MC-6

Parameter	Result	Units	QL	Date/Time Prepared	Date/Time Analyzed	Method	Analyst
Orthophosphate	0.02	mg/l	.01	09-20/1515	09-20/1530	4500-P F	*ECL-R
Phosphorus	0.06	mg/l	.01	09-24/1230	09-24/1400	4500-P E	*ECL-R
TKN	1.4	mg/l	.1	09-20/0915	09-23/1000	4500NH3F	*ECL-R
Ammonia (as N)	BQL	mg/l	.1	09-20/1300	09-20/1345	4500-NH3F	*ECL-R
Settleable Solids**	BQL	ml/l/h	.10	09-24/0930	09-24/0930	2540 F	*ECL-R
E. Coli	2	CFU/100ml	1	09-19/1640	09-20/1550	1603	*ECL-R
Enterococci	22	CFU/100ml	1	09-19/1640	09-20/1441	1600	*ECL-R
TSS	26.0	mg/l	1.0	09-23/1000	09-23/1115	2540 D	*ECL-R
TKN	1.4	mg/l	.1	09-20/0915	09-23/1000	4500N C/F	*ECL-R
Total Nitrogen	1.4	mg/l	.1	11-05/	11-05/	calc.	*ECL-R
Nitrate+Nitrite	BQL	mg/l	.10	10-07/0930	10-07/1600	4500NO3E	*ECL-R
Chlorophyll a**	0.72	mg/m3	.01	09-19/1630	10-23/1500	10200H	*ECL-R
TOC	BQL	mg/l	10.0	10-03/0930	10-03/1700	5310	MAC

BQL = Below Quantitation Level (Result is less than stated QL)

All data meets NELAC requirements unless otherwise noted.

\* = Analysis was sub-contracted.

Greg L. Hudson  
Laboratory Director

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VELAP ID#: 460130





## Report Annex

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### Abbreviations:

NR = Not Reported

ND = Not Detected

BQL = Below Quantitation Level (Result is less than stated QL)

< = Result is less than Quantitation Limit

### Quality Assurance Flags:

L = LCS did not meet method criteria.

H/B = Blank did not meet QC criteria

HT = Sample was not analyzed within holding times.

SR = Surrogate Recovery not available due to dilution.

R = Corr Coef <.995

C = Initial Instrument Calibration (Second Source) did not meet criteria

V = Continuing Calibration Verification did not meet criteria

S = Matrix Spike did not meet criteria

D = Duplicate did not meet criteria

OVR = Overrange- Sample was outside of calibration range

UnR = Underrange w/Diln.- Sample was below low standard because of dilution

TOX = Toxicity exhibited in BOD

G = GGA/Int. QC was not 198.5+/-30.5

Y = Yield not within 10-200mg

\* = Analysis was subcontracted

\*\* = Non-accreditable/non-accredited parameter

### Subcontractor Information:

Information for subcontracted analytical data.

ECL-R=EnviroCompliance Laboratories :460032

Reference to Standard Methods is 18th ed.

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